

# **POISONS, PUTRESCENCE AND THE WEATHER**

## **A Genealogy of the Advent of Tropical Medicine**

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### **Introduction**

This paper attempts to address what seems to be an interesting and central dilemma in the founding of Tropical Medicine as a discipline in the late nineteenth century. The dilemma is in the form of a question: why was Tropical Medicine founded in 1898 rather than 1867 or 1798? Considering the fact that the tropics, and the diseases of the tropics, were available as a medical genre from at least the 1770s in its Anglo-Saxon variant, why was it not founded earlier? (1)

One would presume, by way of an answer, that the time was not ripe before 1898, that a whole concatenation of events, both political and medical, had to coalesce before the discipline could be founded and that these came about only in the last decades of the nineteenth century. It is here that the problem becomes piquant as the discipline, in a "scientific" sense, was obsolete at the very moment of its founding. The events that came to a head at the turn of the century should have precluded the possibility of a separate discipline called Tropical Medicine. Patrick Manson, in the introduction to one of his inaugural statements admits as much and says that strictly speaking tropical diseases are very few. If we do not confine ourselves to the depiction of these few diseases, says Manson, but set out instead to describe the diseases that are found in the tropics, then they cover virtually the whole range of diseases known to mankind and the distinction necessary to sustain the difference collapses. (2)

This self admission on the part of Manson has not been problematised by the commentators on tropical medicine. Its emergence has been attributed either to a metropolitan career venture symptomatic of the heyday of imperialism and the touting of tropical medicine as a new found scythe that promised to subdue, if not altogether extirpate, hitherto recalcitrant diseases and thus free bodies and spaces to be put to productive use (3); or as the result of an epistemological reconstitution where para-

sitology and its cognate disciplines are made to stand in for "Tropical Medicine" (4). While both these accounts offer a vantage point from which to view its emergence, neither of them have suggested it as a solution to the dilemma posed above: how was it possible in 1898, indeed after the discovery of helminths, germs and parasites as the putative etiologic agents of disease, agents which with singularly few exceptions, (within the confines of what was then known) transcend climatic boundaries, to continue to assert that the tropical climate offered the best possibility for the existence of these parasites and hence these diseases were tropical?

The genesis of this discipline has thus not been questioned in terms of its "epistemological illegitimacy" and then political economy brought in to solve the riddle. While the explanation based on political hegemony and the dictates of imperium may not only explain the genesis of tropical medicine but a host of other disciplines founded during the same period, the epistemological history of its birth does not call into question the legitimacy of this discipline as a classificatory act. Moreover, such an account of a radical rupture does, at least, two things. It willy-nilly denies the persistence, through the rupture, of certain cardinal premises. This denial may lead to viewing them, if brought to light, as vestigial rather than as necessary and operative. The posing of a counterfactual, on the contrary, may not only allow one to bear witness to the persistence of "that which has passed" as a necessary and operative category in constituting "that which is novel", but, more importantly, it allows one to critically and systematically reexamine the prelude to the genesis. The attempt to answer how the discipline was founded when it seemed obsolete, and why it was not founded earlier when it seemed perfectly natural, leads one not only to examine the period before Manson, but also to look at all those arenas that may seem unimportant in terms of its later constitution.

Finally, the posing of such a question becomes doubly important as it resists the latest tendency to assume a discourse called tropical medicine before the 1880s (5). Such an assumption would neither answer our question nor be able to critically distinguish that which both separates and unites the period before and after Manson.

In the nineteenth century what ostensibly distinguished the tropics and set it apart as an Other was the climate: heat and humidity. The discourse on heat, humidity and the climate (alternatively the predisposing and active cause in the production of disease) was both prolix and polymorphous and grew into a moral meteorology. But it would be a mistake to see this discourse on the tropical climate as a peculiar and distinguishing feature of the discourse on the tropics. The discourse on climate, on the contrary, was a general nineteenth century European preoccupation, with the tropics no doubt being one end of a continuum where these conditions were realized in the extreme. This figure of "climate as cause" was part of a ubiquitous pathologisation of space and was the very thing that prevented the possibility of a separate discipline called tropical medicine in the nineteenth century. For the tropics, within this general scheme, were seen as a merely privileged site. But it is this very same privileging of climate, which after the discovery of specific etiologic agents should have ceased to be an operative premise, becomes, ironically enough, the framing device for sustaining the contradiction.

Contemporary historiography, far too busy with the category of the "colonial", instead of being suspicious of this divide between the temperate and the tropics, seems to

have actively exoticised the tropics in a way that suggest that the medical theories that were produced in the tropics have the status of being something *sui generis*. This is not to say that the novelty of the encounter did not produce anything new. But even to precisely gauge its novelty one must be aware of what it was a novelty of.

If we do admit that the privileging of climate was not a tropical quiddity then the question that needs to be posed is: why was climate offered as a cause in the origin and causation of diseases from the early nineteenth century onwards, especially with the advent of pathological anatomy and its recasting of nosology in the first quarter of the nineteenth century? The rendering by Foucault in his *Birth of the Clinic* would lead one to believe that this was certainly the case. In the last chapter on fevers he effects a form of closure wherein idiopathic fevers are ultimately resolved and traced to an inflammation of this or that tissue, and finally organic dysfunction, as both the proximate and ultimate cause.

However, throughout the nineteenth century, theories on the origin and causation of fevers, tropical or otherwise, traversed an explanatory terrain with a set of premises on the constitution of the body and the environmental "affects" that it was subject to. With the advent of pathological anatomy, although the notion of Being made an exit and was replaced by linking symptomatic signs to lesional correlates in this or that tissue, with the principle of tissual inflammation providing the motive force in the causal chain of events, it nevertheless failed to resolve the ultimate cause and origin of fevers, which as a generalized febrile malady forever posed the question: was it the symptom or the cause? Notwithstanding Broussais' attempt to resolve the issue, the lack of pathognomic signs in some class of fever or other forever tended to maintain the distinction, awaiting future resolution, between idiopathic and localizable fevers. Such a precarious and mobile nosology was further compounded by epidemics: in their acuteness and territorial spread, in their frequent lack of clear local lesions, they left a nosology based on tissual lesions and an inflammatory principle, quite unable to account for their occurrence and spread. This led to a nascent epidemiology, and a beginning was made through observations of the sun, the soil and the air; of food, waters and custom, towards a compilation and establishment of data and a method, to survey and map the geographical spread, topographical idiosyncrasies, meteorological conditions, and agricultural practices and social life-styles, in an attempt to explain the origin and spread of diseases in general and epidemics in particular. Medical geography in the mid-nineteenth century bears witness to this general carving up of space into pathologic and healthy regions for this or that disease. The sanatorium, the hill station, the voyage, and the furlough (back to good old England!) were the new therapeutics born out of this revival.

The figure that links the theories on the origin and causation of diseases to the observations on "Airs, Waters and Places" is putrefaction. Putrefaction, decomposition, and decay are the central figures and objects of interest. The conditions that hasten these processes seem to be a certain temperature and moisture. Given these two facts of a process, and the conditions conducive to the process, an enormous literature begins to grow around them. And it is easy to see in advance how "Airs, Waters and Places", become objects and sites for the production of diseases. Even easier is it to visualize how the tropics, at once the "cradle of civilization and hence of all diseases", with its

excess of flora, fauna, heat, moisture and people, becomes the pathological site par excellence.

In the eighteenth century a new word is coined by Lancisi to describe the end result of putrefaction, decay and decomposition: malaria. Introduced into the English speaking medical world by Thomas Macculloch in 1827 (6), throughout the nineteenth century, this single figure looms large the world over. The word, meaning spoilt air, begins to be applied specifically to a class of fevers: remittent and intermittent fevers. These fevers designated as malarious fevers include a whole range of clinical fevers, especially those that are marked by some form of periodicity (7). Malaria – bad air – in conjunction with the other word, miasma – stain –, describes a state of the atmosphere that is spoilt, stained, and gone bad due to putrefying animal or vegetative matter, which injures and deranges the functioning of the body.

By the late nineteenth century, however, the theories on the epigenesis of disease are confronted by a paradox. For these particular obsessions with putrefaction, fermentation and the climatic conditions productive of it lead to a mutation. First the worm (Helminthology), and then the germ (Bacteriology), and finally the parasite (Parasitology, Protozoology) (8) with its insect host as vector (Medical Entomology), begin to call into question the miasmatic and climatic origins of disease. It is in the face of this mounting paradox that tropical medicine as a discipline is ushered in.

But before we begin to examine the nature of this paradox, through which, and in spite of which, a discipline is founded, we must examine the nineteenth century, as an extended synchronous moment, in further detail. We must see the problem posed and the place occupied by fevers in the new nosology; the constitution of the body especially with respect to fevers; and the mapping of the environment with respect to its effects on the body and in the epigenesis of diseases. Only then is it possible to see how the medical discourse on the tropics is a variation of a more general theme; the very variation which, apart from the existential fact of the colony and the political economy of dominance issuing forth from it, makes this discipline possible.

## Of fevers

### *The Advent of Pathological Anatomy*

It has been argued that the first radical restructuring of the principle and the basis upon which diseases are to be understood and classified, leading to a system that is still with us, came about at the turn of the eighteenth century. Pathological anatomy was instrumental in recasting nosology by linking morbid symptoms to an organic substratum. One of the many consequences of this redrawing was the exit of the doctrine of essentialism which till then viewed all "local signs" as merely privileged expressions of an antecedent order: of a Being that settles down in the organism and lays down local signs. In fact even after Bichat and the founding of Histology, the above notion continued to persist: that in terms of logical order the local lesion is not the original site, the point of genesis, but merely a privileged expression of disease. Fevers, however, prevented the inversion of the order.

But Broussais, who extended Bichat, made sure that the doctrine of essentialism would be completely snuffed out. He posited that the tissual lesion was indeed the

point of genesis and that even fevers were merely symptomatic expressions. All fevers begin with an inflammation of this or that tissue and spread through a system of tissual propagation to give off symptoms: symptoms peculiar to each tissue. Apart from this spread along tissues they also spread by sympathy to other tissues or lead to functional disorders. But in attempting to define what an inflammation was he said: any local agitation of organic movements large enough to disturb the harmony of the functions, and to disorganize the tissue in which it is fixed, must be regarded as an inflammation (9). This description entails that in terms of logical order there is first an attack on function and then an attack on texture (10). Here inflammation becomes the basis and begins to have a pathological reality that may anticipate anatomical disorganization (11). And from anatomical pathology, with Broussais, we move to physiological pathology, where it is because diseases exist in space, in the body, that they are also visible. And the knowledge of them should proceed from determining which organ is sick: a determination that presupposes that one knows the functioning of the body in its totality. For only then is it possible to anticipate and 'explain how an organ becomes sick (12).

With this a basis is clearly laid for experimental physiology which, with its exclusive focus, by manipulation and measurement, on organs, tissues and (later) cells, begins to lay down the rules of what constitutes Normal Man (13). With it all notions of the personification of disease, of being a species or entity whose Being is antecedent to the body vanish, or at least they ought to have.

The period after Broussais led to the constitution of a reductive dogma. For Broussais then went on to argue that it is the intestine which is the primary site in which organic dysfunction leads to an inflammation of the tissues therein which then spreads by adjacency and sympathy leading to the various group of visible morbid symptoms (14). But, more importantly, the doctrine of inflammation owed its immense popularity to the reductive and simple-minded therapy that it advocated. For it posited that the physiological functioning of the body is simply a question of plus or minus vitality. And inflammation was an indication of a plus vitality, soliciting a therapeutic stance of relieving the body of this plus vitality: relieving it, that is of its blood (15). The second quarter of the nineteenth century bore witness to the dramatic rise in popularity of the lancet and the leech: the number of leeches imported into France grew from 300,000 in 1824 to thirty three million in 1837 (16). The specious simplicity of this therapeutic stance propagated by Broussais and his followers, led no doubt by their shrill insistence in seeing a local and specific inflammation behind every disease, resulted in (comprehensively?) recasting nosology on a new basis. But by the middle of the nineteenth century the anti-phlogistic treatment advocated by Broussais and his followers tapered off. And especially within Anglo-Saxon clinical theaters a new therapeutic regime, the very opposite of blood-letting, along with a clinical conception of fevers based once again on a doctrine of essentialism saw a resurgence. With it we come to the main theses of this paper: that the mid-nineteenth century conception of fevers both in terms of its clinical understanding and its origin is a prelude (and a cohesive one at that): it is what prepared the ground and made possible Pasteur and all that followed in his wake. And, in terms of the current interest here, it is this mid-nineteenth century episteme, in terms of fevers, the constitution of the body and the role played by the

weather in originating fevers and in predisposing the body towards them, that is crucial to the understanding of the discourse on the tropics.

### *The Mid-Nineteenth Century Reading and Classification of Fevers*

The resurgence of the doctrine of essentialism in the mid-nineteenth century had to confront its immediate history in the form of pathological anatomy. In fact, it is a resurgence born of its failure: the felt inadequacy of its basis, and its silence on the question of ultimate origin, especially of epidemics, led to two lines of inquiry, or, rather, saw their hitherto suppressed but now transformed efflorescence: the doctrine of the essential nature of febrile maladies caused by a poison; and putrescence and all that is productive of putrescence being the original cause of this poison. We will now examine the first of these.

Clinical diseases in the mid-nineteenth century were divided into three major classes. The first were those diseases that had a clear anatomical basis. The second were the class of diseases that were neither febrile, nor the result of any organic or tissual lesion. These were the neuroses or nervous diseases: mania, epilepsy, lock-jaw, hydrophobia, hysteria, chorea, convulsions and so on. The third were those essential maladies marked by a generalized febrile reaction where local lesions, if present, were by their very inconstancy, purely secondary and symptomatic (17). The question that immediately arose was: what distinguished the fevers from the nervous disorders in so far as they both lacked a clear and well defined organic basis? The difference lay in the following characteristics.

*Fevers* obeyed the great law of periodicity. They had a well marked beginning and termination which invariably, unlike other diseases, left the patient with no after effects that would result in a chronic course. Moreover, left well alone, barring the death of the patient, they terminated automatically: all that was necessary was to keep the patient alive while it made its exit.

Fevers, again, were contagious. They were communicable from person to person like in the case of all exanthemata; or some poison from the air, water, etc. was the active contagion in initiating them, especially in an epidemic form. (Witness how this notion of contagion dissolves the "normal" distinction between contagious and infectious.)

The *local lesions*, where present, were marked by an inconstancy and variability. They, too, were invariably subject to the same law of periodicity and subsided soon before or soon after the exit of the fever.

The local lesions, however, though secondary, had a crucial relationship to the general course of the fever: by their propagation and spread they at times caused the prolongation, recrudescence and a general interference in what would otherwise be a well marked course. Hence the confusion that arose over the lesion: for often their cure led to the fever's making an exit which in reality was just a question of removing the interference so that the fever could be restored to its essential form and follow the law of periodicity.

The essentiality of fever predicated the possibility of metamorphosis and transformation: typhus could lead to typhoid and vice-versa. Especially during epidemics such

transformations and movements were common: though the exanthemata usually reproduced their own form.

*Epidemics* were invariably characterized by more than one form of fever: sometimes they ran parallel to each other; moved from one to the other; or were spread across bodies. They were, however, characterized by a specificity: an overarching epidemic influence (of which more later) which gave each epidemic a specific gravity, reflected in a primary and predominant set of symptoms with its specific mark. It was a change in their character, says Stokes, that supposedly accounted for the demise of blood-letting as a mode of therapy. For if the great epidemics of typhus and typhoid up to the 1830s were sthenic in their constitution, characterized by a violent and bounding pulse, an excess of nervous and vital energy necessitating the lancet, the leech, starvation and the poultice, with the coming of the first cholera pandemic in 1832, we have a new style: an asthenic presentation with a weak pulse threatening to waste and sink the body, soliciting a regimen of stimulants: wine and tonics.

Finally, the essentiality of fever called forth a uniform therapeutic strategy of allowing the fever to make its exit: and the treatment of local symptoms were to be carried out with this in mind. For too many lives had been lost by the shaving of the head and the wholesale application of leeches to treat a violent headache during a fever: a mistaking of the symptom for the cause, which resulted in the patient promptly dropping dead (18).

The consequence of this classification was that while local symptoms in non-febrile maladies could be safely assumed to be the result of some form of specific tissual or organic inflammation, in the case of fevers it would be a disaster to read them as such, especially so in the case of continued fevers such as typhus and typhoid.

What, moreover, was the consequence for therapeutics that arose from this doctrine of the essentiality of fevers, especially the continued fevers? In opposing the doctrine of the inflammatory character of fever it was claimed:

*"The truth is that disease of a really inflammatory character is the rarest thing possible in typhus or typhoid fever, it is so rare that some do not believe that it ever occurs. Apply this axiom then to treatment and see what becomes of that doctrine which advocates bleeding in fever, which advocates starvation and purging, and forbids the use of wine and other stimulates".* (19)

But the notion of essentiality could not entirely escape the dictates of pathological anatomy. Although it did not accord it primary status, it nevertheless had to confront it as a secondary and derivative phenomena. These secondary effects were divided into four classes: the first were functional or nervous – a disorganization in function or a generalized nervous reaction without any organic change; the second were those derivative effects that resulted in anatomical changes but without resulting in inflammation; the third class of local affections were those marked by inflammation: brought about by the infiltration of the organ by "'typhous material' which, though capable of retrocession, without any consequent injury to the part, very often does not take place, or is interrupted by actual inflammation of the tissues which are infiltrated"; the last of the four occupies a special and different terrain. It concerns the heart and circulation. It was supposed that a "fatty degeneration of the heart" – such as in non-febrile

instances – occurred by the infiltration of the typhous matter, leading to its “softening and a temporary weakening of the left ventricle”. This results in a want of blood supply and to a general anaemic condition: an illustration of the development of important nervous symptoms, not from fullness or congestion of the brain, but from anaemia. And once again the reason perhaps as to how well wine is tolerated by the brain during fever. Moreover, the tolerance and the good effect of the stimulant is an indication, once again, that the condition of the circulating and nervous system [is] the opposite of inflammation, as we understand the term (20).

By way of recapitulation and summary, the following conclusions can be drawn. The first is that irrespective of Broussais' claim that dysfunction leading to anatomical disorganization is a sign of inflammation, we see how a clinical reading of what constitutes an inflammation varies. This variation and distinction is part of a larger divide where a certain mode of therapy that arises from the theory of inflammation – a particular doctrine that, by and large, most diseases are sthenic in their constitutional presentation arising from a plus vitality of the body; and, finally, that local and specific causes are primary and exhaust the possibility of what constitutes the moving cause – is opposed. In its stead we are offered the possibility of the essentiality of a large class of the most threatening and acute of diseases: fevers.

Here, though local lesions find a place, it is a subsidiary one. A more generalized cause in the form of a fever poison – the typhous matter is but one example and synonym – leading to a general febrile reaction is posited. This poison could be a palpable contagion as in the case of the exanthemata; or could arise from a number of other factors: putrescence prompted by the weather, filth, overcrowding and so on. Finally, a new figure and a new style in the form of the anaemic constitution and an asthenic presentation is ushered in: one that militates against the reductive dogma of the theory of inflammation and the alacrity with which the lancet and leech are solicited in its aid.

We will see when we turn to the effects of the weather upon the body, in the ways in which it deranges the functioning of the body and predisposes it towards disease, how the two figures of the asthenic and the anaemic play a cardinal role: the first an indication of the overall sapping of the vital energy leading to the degeneration of the physiological functions; and the second, the degeneration of the blood by intoxication: the poison, the ptomaine or the typhous matter. The very same weather, in a larger and resonant sense, is the catalytic and moving cause in the very production of these ptomaines or poisons.

### **The climate and the body**

*The Influence of Warm Climates Upon the Body  
Many die suddenly, others droop, and all degenerate*

J. Johnson

The role played by climate is manifold. The first of this could be indicated under the title of medical geography where a correlation is set up between diseases and topographies: out of this issues forth the sanatorium, the use of climate in the treatment of diseases, hydrotherapy and aerotherapy. The second and derivative, or connected theme



is the precise role played by climate in the epigenesis of disease, especially of epidemics: either by temperature, humidity, diurnal variations, seasons etc.; or by setting up of fermentative reactions, which under given natural and social conditions, lead to the production of a miasma. The third is the influence of climate per se on the physiological functioning and the pathological processes of the body.

It is here that the discourse on the tropics throws into relief the general European obsession with climate and all that it engendered. Though the effect of the tropics is but a special instance of this overall theme, it affords, in the extreme, what elsewhere may seem muted. Moreover, it also brings into play what one aspect of colonization engendered.

We will begin our analysis with the third of these effects, namely, the influence of a tropical climate open the body. The generalization of this theme, via the privileging of the tropics, is taken up in the two subsequent sections.

Edward Birch, the principal of the Calcutta Medical College, echoes as late as in 1893 what Johnson, Maclean, Twining and Martin initially spelled out in the first quarter of the nineteenth century (21). He says that the principal effect of a prolonged stay in the tropics is the production of a slowly advancing asthenia and cachexia: brought about by "a long continued high temperature; the presence of malaria; and the great diurnal variations at certain seasons". The ever-present and constant operation of these factors leads to an "excessive cutaneous action alternating with internal congestion" (22).

What are the pathological consequences that naturally follow from this? They are "the deterioration of the blood; degenerative and other changes, the usual resultants of hypeamia; and the liver, kidney and intestines become incompetent to perform their eliminative functions adequately" (23).

How does this come about? It is brought about supposedly by an overall alteration in the distribution of blood in the play between respiration, perspiration and excretion.

#### *Perspiration, Respiration and Excretion*

The theory of the redistribution of the blood is premised upon the norm of a body adapted to cold. The body when placed in an environment which is antithetical to this "norm" suffers a derangement. It is claimed that the lung capacity in the tropics is greater. But the number of inhalations and exhalations per minute is less. The end result is that the amount of air inhaled is less. This is then compounded by the fact that the amount of oxygen in warm air is less, leading to a further reduction. Thus, instead of 255 cubic inches of air being made available, only 222 1/2 or thereabouts is available in the tropics. This automatically leads to a reduction in the amount "of carbon thrown off by the lungs", as there exists a strict ratio between the air inspired and the carbon thrown off.

The increased capacity of the lung, however, is not an adaptation towards the intake of more oxygen, since it is clear that the amount of air inspired is actually less. Instead, it is proof of the fact that there is less blood in the lungs, making room for more air. The reason for this reduction being that the blood is diverted either to "surface or internal organs, as the case may be, under the influence of external temperature to which the body is subjected".

*"An accommodatory relative fluctuation, essential to the perfect working of the cooling apparatus on the one hand, and of respiration on the other, is thus maintained in accordance with requirements of the varying climates. Rattary estimates that 23 oz represents the total withdrawal of the blood from the lungs under the influence of an average temperature of 80-83 F" (24)*

*"This distribution, however, is the first and cardinal step towards anaemia: for the drop in the amount of air inhaled leads to less oxygen being available thereby impeding, nutrition and sanguification".*

This redistributory act poses yet another problem. For it is clear that a body in the tropics is decidedly oriented towards heat and the "exaggeration" of the perspiratory function. This results in less blood being available in the lungs and the internal excretory organs. Another indication of this is a reduction in the nephritic vascularity (17 1/2 %) and that of the lung (4 1/2 %), matched by an increase in secretion (24 %). This "balance" is severely upset when the body is subject to "chill" brought about either by diurnal variations during certain seasons, or the sudden increase of moisture. In either case, to varying degrees, the excretory organs are flooded with a sudden and large supply of blood, leading to serious congestion. This may mean a failure to relieve a sufficient quantity of water resulting in a transitory increase in the liquid constituents of the blood, leading to pulmonary haemorrhages.

What emerges from this play and redistribution is the essential figure of the anaemic; and the constitution of the precarious and vulnerable body. This theme of wasting and impoverishment is then multiplied: the pulse is slower; there is a general depression and relaxation of the vasomotor system; the muscle tone and nervous function, after an initial period of exaltation, become lax; the incapacity to generate animal heat and the inability to exercise lead to a fall in appetite and loss of weight; and the impoverishment of blood because of its vicarious distribution and that great blood destroyer-malaria-deranges the body.

*"As a rule, the bodily weight is diminished by tropical residence; and the muscular system becomes deficient in tone, as the result partly of the withdrawal of blood by which its nutrition is rendered slower and partly because it is less exercised. With a slower digestion, a lessened appetite, and a feeble circulation, diminished lung work and blood oxygenation, and therefore less perfect nutrition, a generally relaxed state, a diminished necessity for surplus fat which is absorbed, and a tendency to poverty of blood, we have the natural consequences of lessened bodily vigour and loss of weight. Rattary has shown that in youths, a tropical climate interferes with normal development of the body, though growth in height is rather augmented" (25).*

### *The Wasting Body*

It is in the figure of the child, embodying the future of the race and the possibility of rule, that the fear and the horror of waste and corruption, engendered by a climate that is at once moral and meteorological, that this narration reaches its acme. Martin, writing in the early nineteenth century, claims that beyond 5 to 6 years a physical and

moral degeneration occurs to the European child in India: the child then "exhibits the necessity for change of climate by emaciating and outgrowing its strength", it "begins to exhibit a restlessness and mobility of the nervous system" a "busy idleness" beyond [its] age, as compared with habits of children of the same ages born and bred in England. There is also a marked disposition to relaxation, and to a loose relaxed state of joints in such children, and to "consequent lateral curvature of the spine" (26). Fayrer, echoing this towards the end of the nineteenth century, says that if the child is not sent to England beyond the age of 5 or 6, "it will deteriorate physically and morally, physically because it will grow up slight, weedy and delicate, over precocious it may be, and with a general feebleness not perhaps so easily defined as recognised, a something expressed not only in appearance, but in the very intonation of the voice; morally, because he learns much from his surroundings that is undesirable, and a tendency to become deceitful and vain, indisposed to study, and to a great extent unfitted to do so, in short, with a general tendency to deterioration which is much to be depreciated, and can only be avoided by removal to the more bracing and healthy (moral and physical) atmosphere of Europe" (25).

In this multilayered text a number of premises are at work. One is the antipodal division of the world between England and India (the tropics): a physical and moral division imbued with an affectivity of which we will say more later. The other is the insidious (and perhaps elsewhere explicit) itemization of all the characteristics of the native: the lazy, indolent, anaemic, asthenic and degenerate being who constantly and threateningly casts his shadow; and whose image forms the unstated motif of comparison. The possibility of being cast in his like by a prolonged stay, reaches its elaboration in the virtual identity established between the European child born and bred in India, and him.

This naturalised moral rhetoric on climate is premised upon the notion of acceleration: an acceleration of growth beyond the normal; an acceleration not in keeping with the moral and physical requirements of the growing body in keeping with its age and what is right for that age. Hence the exhibition of "a restlessness and mobility... beyond its age", hence, too, an excess of height not in keeping with normal development; and perhaps even an over-precociousness. But each of these leading to an enfeeblement and degeneracy; an emaciation and outgrowing of strength exhibiting "the necessity for [a] change of climate".

This principle of hastening by heat, of an advancement of growth leading to malformation in children; and the wearing out and degeneracy of functions and tissues leading to a collapse of the constitution and morals in adults, is worked out, in perhaps its most "rigorous" form, in the figure of menstruation. A statistical table of ages and races is the authoritative prelude. The English girl in England – the norm – menstruates at a late age. The English girl born and bred in India comes next; followed by the Eurasian, the Eastern Jewess and finally, the natives: Hindus and Mohammedans. Notwithstanding the fact that a Dr. Sen (the re-formed native) is called upon to authorize and claim that it is the evil custom of early marriage which hastens the process of menstruation, a practice which exists to a much more serious degree than his mere hints convey, and [which] no doubt produce their effect, the fact of "the difference between Anglo-Indian

and English girls is almost conclusive that climate per se has a marked effect": an effect signaled by the excess of haemorrhages, abortions and miscarriages that the Anglo-Indian girl is subject to (28).

A number of strategies and consequences are coeval with this obsession on the loss of physiological and moral vigour. Apart from the clear case of the Eurasian, the secret stigma that surrounded the second generation Englishman, or one long resident in the tropics – under the syndrome of going native – even among the upper classes, is well known. All part of the anxiety and possibility of settlerism, of rule and of hegemony: premised upon a principle of difference and hierarchy; and maintained by the strategy of distance and purity. The discovery of the "hill" in the early nineteenth century and its development into a station, cantonment, summer capital, and retreat is but one consequence. And the hill station school, which comes into existence from the middle of the nineteenth century, is also part of the same picture. Though, even here the "tropical hill" as a retreat in the case of illness was advised against: as the sudden change of climate led to congestion, "polyuria and smart diarrhoea". And the only remedy for a serious collapse was a journey back to England: a gradual change of climate towards the morally and physically bracing climate that is England.

This obsession with climate should not be construed, however, as something exclusive to the tropics. Although it is true that the tropics – the site of colonisation and Empire – solicited its own peculiar attention, it is part of a larger pathologisation of space: with the tropics no doubt being an antipodal Other. We will now turn to the larger theme of the pathologisation of the globe via the manichean division of the globe into those two obvious categories: the temperate and the torrid.

### **The manichean division of the world**

Durkheim and Mauss in their "Primitive Classification" argue that classificatory schemes, including the most recondite, have a socio-logic behind them. They claim that logical relations are in a sense domestic relations, or, are representations of relations of economic or political subordination; and that sentiment and affectivity are the motive forces in their ordering.

The division of the world in Anglo-Saxon medical discourse seems to offer a clear example of their summated argument. For the world in Anglo-Saxon medical discourse of the nineteenth century is posited in the form of an essential division. One part of this divided realm is a point: England. The other is a large and variable band running latitudinally around the earth, marked by a central line, the equator, and bound in a shifting and uncertain way by the tropics of Cancer and Capricorn. This antipodal division is labeled climatically the temperate and torrid zones. The first, as the word indicates, is marked by moderation; while the essence of the latter is excess. By the end of the eighteenth century this antipodal division is well established. And an enormous and polymorphous discourse on the law of intemperance, of a torrid and trying climate – physically, morally and psychologically – begins to proliferate. As late as 1896, Weber and Foster writing on the use of climate in the treatment of disease, begin their description on the climatic character of a locality by saying that it "depends chiefly on the distance from the equator" (29). For, supposedly, it is in and around the equator that deleterious

qualities which are likely to render a climate unhealthy come into play: a luxuriant vegetation with rapid growth and decay leading to a higher amount of "organic and inorganic substance floating in the air"; a sustained high atmospheric temperature accompanied by a high degree of humidity; and sharp variations in the night and day temperature, leading perhaps to the production of "chill". If this pageant is set upon impermeable ground like clay, peat or marsh, then there is the making of a pestiferous and pestilential spot: unhealthy and singularly trying in the extreme for – and this is unstated – the white skin.

Framing axioms such as this are invariably sought to be proved by a simple table of the variation in the rate of mortality according to the latitude. It seems that 1 in 25 people die between 0 and 20, which progressively decreases to virtually half at 1 in 55 deaths between 60 and 80. A table which at once universalizes the facticity of this claim and is also the final proof of the premise that cold is not injurious to health.

Foster and Weber seem to construct their argument on one seminal parameter: humidity. For both heat and cold are stimulants. But moist heat and damp cold are injurious. But even this is immediately sought to be negated by the claim that damp cold and winds are injurious only for the unhealthy, weak and elderly. And by the same logic, health resorts (their location, climatic description and their use for this or that disease is what the discourse is about) are good for the weak and bad for the strong. For as they go on to say (30).

*"We must acknowledge that the climates of England are rather moist, that the air is often dull and sunless, that rain falls on comparatively many days, and is distributed over many hours, that the wind is often high and chilling, and that the shelter is limited. On the other hand, the hygienic conditions are better than anywhere else, the food is good, and the separation from the family is less. The climates of England belong, as we have said, to the most health-giving climates for the fairly vigorous, but are less good for the delicate invalid".*

and elsewhere,

*"The climates of England... belong to the most health giving in the world. They produce the finest trees, the finest animals, the finest men and are the most conducive to longevity. They are it is true, not the most agreeable or exhilarating climates such as those of Egypt, Spain, Italy, Greece, Asia Minor "but the brightest and most exhilarating climates are not the best for health and longevity, they are in many ways inferior to those of England". (31)*

But as England may be injurious to delicate and diseased persons, one must "endeavour to find climates for invalids" (32).

It is immediately apparent that the universe that negates the dull, sunless and moist England is a social universe. Hygienic and nutritive conditions are the ones posited as counters to a dull climate. And more importantly the implicit contrast of a person resident in England as opposed to one elsewhere, say in the colony, is smuggled in by the claim that the "separation from the family is less".

Such an essentially social and moral rhetoric can be multiplied ad infinitum. But what is of interest here, apart from what obviously meets the eye in this insular logic, is the

particular obsession with climate in general and heat and humidity in particular. The consubstantiation of the physical, the social, and the moral are seen to engender disease: either by a sustained high atmospheric temperature, or by variations in the diurnal temperature, that disposes the body towards disease; or, mediately by giving rise to a general state of the atmosphere which here, too, is once again premised upon the same principle of acceleration: a luxuriant vegetation with rapid growth, productive of rapid decay, leading to a high amount of "organic and inorganic" substances floating in the air, staining it, and hence productive of disease: a concept encapsulated in the word *miasma*, meaning stain.

But this primary and antipodal division of the world into two physical, social and moral universes, premised on climatic conditions is, however, part of a larger pathologisation of the globe, where climate and topography begin to be systematically mapped in a classificatory act in an attempt to plot and explain the genesis of diseases.

### **The pathologisation of the globe**

The appearance of Boudin's "*Géographie Médicale*" in the year 1856 (33) is symptomatic of one of the first systematic attempts to draw a new map: the Pathological Atlas. It divides the whole of France into departments. Each department is shaded in terms of death rates, or by the number of conscripts rejected due to certain diseases, in proportion to the population. This visual and synoptic ensemble makes legible at a glance, the most healthy and the most pestilential spots; with a further examination revealing which niche is the *nidus* of which disease. This inspection makes possible at once a comparison. The pathological map can be placed alongside the geological map, maps of physical geography, hydrology and meteorology; and with maps of the distribution of other diseases over the same area, or with the distribution of the yield of crops.

Nineteenth century England, too, witnesses the same phenomenon. The Registrar General's Decennial supplement for 1857-1860 is published in 1864 as part of the 25th Annual Report. Then comes the supplement for 1857-1870, giving the death rate from twenty different causes, for age periods and sexes, for 630 registration districts. This new form of statistical data, inaugurated through the Registrar General's published reports, is prompted by the first Cholera pandemic of 1831. One result of it is the creation of the office of the Registrar-General, which from about the mid-nineteenth century onwards begins to compile and publish these reports. This in turn enables Haviland to publish his version of the coloured map of England. Such maps, as stated, make possible a comparative exercise whereby a systematic explanation of the prevalence of disease in terms of their geographical setting become the order. The whole discourse seems to be built around two obsessions: the atmosphere and the nature of the surface that gives rise to this atmosphere.

The discourse on the atmosphere is built around the composition of the air; its temperature, moisture and the variations that it is subject to; and the force, direction and circulation of the winds. The principle that orders the discourse on the surface is the "distance from the equator". Or, to put it differently, it is organised around the norm of a dry, equable and temperate climate tilted towards the "real" English climate, and,

needless to say, away from the Other. The equator thus becomes the repository and point of departure for an unhealthy climate and the movement away from it as being increasingly healthy. Hence it is that elevation, which is but a variant on latitude, features second. But thereafter the discourse does get exhaustive and covers a whole range of aspects on the nature of the soil, its geological setting, its particular aspect towards the sun and the winds, its mode of cultivation and finally the existence, if any, of industry and the drainage that is carried out in that area.

The enormous discourse that begins to proliferate on the relation between climate, weather and disease, although it seems to begin, as we pointed out, with Sydenham's revival of Hippocrates observations on "Airs, Waters and Places", in an attempt to account for the genesis of epidemics, it comes into its own only in the middle of the nineteenth century. The inauguration of certain statistical and administrative procedures, the institution of surveying the landscape in various ways, makes this possible.

But this particular concern with meteorological conditions can be understood only if its relation to the causation of disease is properly grasped. One example of it is provided by Haviland in his "Medical Geography of Great Britain" (34), where he sets out to explore the relationship between Heart diseases, Cancer, Phthisis and geography. He concludes that ventilation is an important principle in the low or high prevalence of heart diseases. River valleys which open out "in line with prevailing winds, which sweep up and ventilate them", suffer from a low mortality; while those that lie across or against the line of the wind, where the wind sweeps over them rather than up them, creating what Hippocrates described as "stuffy hollows", have a high mortality. Similarly, flat-foreshores, where air flushing is not obstructed is marked by high mortality and precipitous ones by the opposite. This same set of rules is reversed in the case of Phthisis.

Phthisis, which by the late nineteenth century is recognised as tuberculosis caused by the bacillus of Koch, is set in motion either by sudden chill, prolonged chill due to the dampness of clothing, or by exposure to strong winds from the sea. It results in inflammation and suppuration of the lung tissue activating the *B. kochi*. These activating conditions are quite clearly prevalent in those areas which are well ventilated.

Cancer mortality is seemingly conditioned by the opposition between high and low ground. "Cancer fields" are found in low lying vales traversed by fully formed and seasonally flooded rivers; regions of low mortality are to be found on elevated ground, with the lowest mortality coinciding with limestone areas.

This general carving up of physical space into pathological regions, with the former engendering the latter, seems to have as a set of minimal conditions humid heat and moist cold, the presence of which, supported by a topography favouring their production, generate diseases (35).

If an encounter with the tropics produces in some measure the "torrid" discourse around humidity and heat, it is paralleled in the English imagination by damp cold. We have already seen how sunless and moist English weather has to be defended. The reason for this is the coming into being in the late eighteenth century of the manufacturing towns with their large, damp, overcrowded and overworked tenements, which become from the beginning of the nineteenth century onwards the captive spaces where epidemics play themselves out. The fear and horror that they evoked, the danger

that they posed to the community at large, after the first great Cholera epidemic of 1831, in England and elsewhere on the continent, led to sanitary reforms and the creation of a statistical bureau along with an array of connected inspectional posts and laws, to record, plan, monitor and control these activities. Hence, it is none too surprising that the entire conceptual and institutional arsenal, beginning perhaps with Sydenham's inauguration then, reached a systematic level by the mid-nineteenth century.

But the particular obsession with climate and weather as the cause of disease becomes complete only with reference to the theories that are held on the causation of fevers. For, most if not all epidemic diseases were classified under the head of fevers. And fevers accounted for perhaps the largest number of deaths in any one year. And a genealogy of the origin and causation of fevers will demonstrate how the general pathologization of the globe through geographical conditions, topographical features and the type of flora and fauna that they house, and the atmosphere that they give rise to, are all intrinsically tied to the production of disease: with the tropics being a privileged pathological site.

### **Pathogenesis**

We have already seen the role that climate and topography play in activating diseases. The effect of climate upon the body in predisposing it to these activating causes has also been witnessed. And the analysis of fevers, in terms of its clinical reading, revealed the existence of and search for a possible cause, other than a pure circumscription of the ambit of disease around the ambit of the body. The resurgence of the doctrine of essentialism, in refusing to reduce all diseases to the principle of inflammation, and in its conception of a general poison being the cause, maintains the search for such an origin. It is the figure of putrefaction, as we indicated in the beginning, that links these seemingly disparate themes and concerns together.

Putrefaction, as a figure, encapsulates a number of processes, objects, conditions and consequences. As a positive figure in the form of fermentation, it is what makes cheese, wine and beer. As a negative figure it indicates decay, degeneration, intoxication, suppuration... in short, the morbid. As a neutral figure, it involves a process of transformation and alteration; of metamorphosis and movement; and of bringing into being something new. It is, to put it differently, a principle of generation: of life and diseases, beings and objects: of consumption and use. Hence the objects of interest were all those organic substances ripe and ready for the process of transformation: meat, corpses, excretory wastes and food: cardinal and symptomatic figures that saw increasing attention being paid towards abattoirs and stables; sewage, ventilation and drainage; the dead and cemeteries; and finally, in the overall figure of sanitation and hygiene (personal and public), with all its attendant figures of filth, overcrowding, malnutrition, disease and death.

For the whole of the nineteenth century the problems posed by these objects and sites was the focus of interest. Filth and odour which till the end of the eighteenth century were powerful antidotes and therapeutic strategies to ward off evil and diseases, are transformed into objects and sensations of disgust: the strong perfume, the inhalation of excreta, the use of garlic and herb as talismans and charms (with their associations



with the powers of darkness and horror, as being a mark of witches and their schemes), make an exit (36). Although it is true, especially among the lower classes, that these remedies and strategies survive strongly till well past the middle of the nineteenth century, they are reduced in part to the symbolic rather than being substantial. A genuine and universal transubstantiation of the object and the power it embodies, to ward off disease and misfortune, becomes a supposition: a symbolic sign of desperation rather than belief.

But what is true for the loss of belief in therapeutic strategies is certainly not true for the inherent possibility in them for the generation of diseases (37). It is as secularized and consubstantial objects that they now demand attention. And the focus on Airs, Waters and Places should be seen as attention paid towards objects and sites that make possible the process of putrefaction and their emanations: miasma, malaria, poisons and ptomaines.

Pasteur's work on fermentation, the initial search for poisons and then fungi and germs in marshes, stagnant water and the air, the attempt to produce experimentally, fevers from putrid emanations of the body, are all part of this quest: with the old and well established practice of variolation in the case of the exanthemata providing the model for this quest.

But the theory that captures this quest best is the one put forward by Murchison in 1862 in his treatise on the continued fevers of Great Britain (38). Murchison's new explanatory term, "Pythogenesis", is the syncretic encapsulation of the seemingly contrary pulls that mark the nineteenth century in its attempt to explain the genesis of diseases: especially the epidemic fevers. Translated into popular parlance as "filth diseases", it posits that filth produces ptomaines and these ptomaines set up fermentative reactions in the blood, leading to poisoning.

The theory of pythogenesis, by making filth an object, makes a certain life-style – overcrowding, uncleanness, the lack of sanitation and drainage, etc. – accountable. This coupled with a certain temperature and moisture responsible for putrefaction and the production of ptomaine, makes the weather and season the catalytic cause. It further posits a homology between putrefaction by filth and the ptomaine so produced spoiling the blood, under certain conditions of moisture and heat and those phenomena produced under damp cold.

Murchison's theory ought not to be seen as something startling or new. It is merely a coherent refraction, a gathering together, of the different statements and concerns of the nineteenth century. For in it we see how the genesis of fevers, the attention paid towards the poor, filth and sanitation, and the role played by climate in this genesis and upon the body in the form of an almost strict homology, all hang together. It is the medical equivalent of the popular apposition between the poor, filth, dirt and disease: the well established syndrome where the victims are made to bear the burden of the crime.

But Murchison's theory is also a reflection of all that presages the attention paid towards blood. We have already seen the concern with the impoverishment of the blood elsewhere in the figure of the anaemic. In fact when Laveran first posits the possibility of the pigmentation in the blood as a parasite, it is opposed on the grounds

that it is the effect of the degeneration of the constituents of the blood brought about by the fever and not the cause. And later this pigmentation becomes the first distinguishing mark of malarial fever from other fevers, and leads initially to a search for this "miasma vivum" in all the well established sites. The later development of the classification of infections in terms of the toxins produced by germs (as they were initially all thought to be) and by their mechanical reproduction and obstruction, stem from here. But what is of interest here for us is how this theory manages to capture the canvas of nineteenth century themes and concerns; and one which allows different actors to engage in a seemingly ceaseless and chaotic argument over the primacy of this or that cause, site, object, process or event (39).

### Conclusion

At least from the middle of the nineteenth century a definite and new rhetorical space is created: the pathological atlas: the basis of which is a physical and moral meteorology. This rhetorical space is built on a global scale around an old opposition: continence and incontinence. The first varying between a point and a zone depending on whether the discourse is exclusive: Anglo-Saxon, Francophone, etc., or inclusive; the second, is the Other to this self in a different guise: the tropical world. The whole discourse on tropical medicine is an extended trope on what happens to the Self in this Other world. Hence the none too surprising and variegated nature of the discourse which, under the guise of health in the tropics, could range from how to treat sun-stroke and fevers to the colour and choice of clothes; the mode and method of choosing a native wet nurse for a non-lactating white mother; the feeding and clothing of children; the method of choosing horses, dogs and native servants, and where and how they are to be housed, fed, treated and used; what is to be put away in a vanity case, a travel case, etc.; what is to be eaten and where; which health resorts to choose for which disease; how to design houses and what material to use in their construction and, finally, the physiological functioning of the body and the modes of production and propagation of disease. In short, the preservation of the Self (in the face of assault and onslaught) in the tropics. And the basis of this onslaught, built primarily around the figure of attrition, is climate.

We have seen how the preoccupation with climate and all that it supposedly engenders is not only part of an essential division but of a global pathologization. A universal spatialization of disease that gives a new urgency to an old term: endemic. A word that is set not in opposition to the word epidemic, but in opposition to the contagious diseases: the exanthemata in general. Although the exanthemata in their visible form – the eruptions – clearly harboured the notion of a contagion vivum, they often failed to satisfactorily answer the vexing question: what is it that made an endemic disease epidemic? If the endemic was mapped in terms of a rather fixed topography, then it was the sudden vicissitudes in the weather, often unusual in their advent for the season, that produced an "epidemic influence". Any reading of the controversy over epidemic diseases – whether they were contagious or not, that is, whether they were spread by human intercourse and all that is part of such intercourse – should bear this in mind. Often a contagium vivum was not set in opposition to miasmatic origin, but

a miasma vivum coexisted with a contagium vivum with each engendering the other. A seeking of the cause of this miasma led, among other things, to the study of topography and meteorology. And we are back to physical and meteorological factors as the "local" cause of this miasma. This local and spatial cause, if ever-present, was what made a disease endemic.

Ironically enough, this preoccupation with climate as cause, disallowed a separate category called "tropical diseases" in the nineteenth century. This turning to climate as cause was a way of keeping alive the search for an original cause in the face of the felt inadequacy of pathological anatomy as a basis. The precariousness of a nosology based on morbid anatomy led to the questioning of attempts to delimit origins to single and specific causes and offered in its place a variegated picture based on clinical and epidemiological experience. The modified essentialism of a Stokes, and the inclusive doctrine of Murchison, bear witness to what was the predominant tendency. By the close of the century, the germ as an etiologic agent, as a putative causative mechanism, opening up the possibility of recasting nosology on a new basis of "like initial causes", threatened to recast the controversy. But where neither lesion nor a germ or parasite was clearly discernible, we are back to idiopathic fevers and the privileging of climate as a factor. And even where the germ was available, climatic factors are privileged as predisposing, conducive, or even essential prerequisites, either for the very existence of the germ, or for its transference, or for it to thrive.

Fayrer, one of the last representatives of the old school, who, as late as 1897, writing "On the Climate and Some of the Fevers of India", says that

*"whatever causal part micro-organism or miasmata may play – the fevers are mainly described by climatic causes. The effects of heat, cold, and other telluric and meteorological conditions, producing various changes in function and structure may themselves be efficient causes of fever; may induce autogenic ptomaine poisoning; may render the body a congenial subject for the development of micro-organisms which act as causes, either directly or by the toxic effects that they produce, or may favour the action of telluric miasmata"* (40).

Reminiscent of a syncretism worthy of a Murchison, it subsumed the germ – still nebulous entities – by subordinating it to a non-exclusive scheme where climate, if not privileged, was on a par with other causes.

It is at this liminal moment that Manson attempts to rework the terms. While he is aware that climate does play a role in predisposing the body or even exciting a relapse of Malaria, much like hunger, fatigue or fear, climate by itself may not be the cause of a malarial attack (41). But climate rather than being abandoned is now reworked and valorized to serve new functions. Climate, and the natural and social organization that they entail, become the new basis of the "etiology of tropical diseases".

It is only when we realized, remarks Manson, that it is etiology rather than pathology which offered the key, that a whole host of problems that had befuddled us hitherto, were solved. And once the etiologic principles began to be mapped the science began to make rapid strides (42). What does this new figure of etiology offer? On the one hand it offers for the first time a clearly visible and analyzable object: the microbe; and on the other the medium, the soil, or the conditions most conducive for its existence,

growth and spread: the tropics. For it is here, in terms of climate, social organization and custom, in the mode of eating and marrying, the conditions, supposedly, for an unfettered thriving of these microbes is fully realized! This, coupled with the professed promise of differentiating new diseases and new agents along with their mode of transmission and spread in this Eden of pathos, opens up an eponymous field which makes tropical medicine an exciting discipline with an unimaginable potential for growth.

Hence it is we see how the formal inauguration of this discipline, which at the very moment of its founding calls into question the very basis upon which it is being founded, is sought to be sustained. It is done by at once exorcising and reinscribing climate. If the older theory of climate, based on a physiology of circulation, was a trope for a rhetoric of native indolence, and the subsequent fear of being cast in his image, the reworked presumptions make climate a trope for the native environment and the native body as the original and cardinal site of dangerous pathogens. Parasitology and protozoology, instead of burying the possibility of a distinctive tropics, are pressed into service to constitute a radical rupture between the tropics and the temperates. And Manson's caveat about the scientific truth of the classification simultaneously frames the subject and disarms the possibility of an interrogation.



## NOTES AND REFERENCES

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- 1) Hillary, W., *Observations on the changes of the air and the concomitant epidemical diseases in the island of Barbados, London: 1759*; Lind, J., *Essay on the diseases incidental to the Europeans in hot climates*, J. & Richardson, 6th edn. 1808 (first edn. 1768); Jackson, R., *An outline of the history and cure of fever of the West Indies*, Edinburgh: 1798.
- 2) Manson, P., *Tropical Diseases. A Manual of the Diseases of Warm Climates*. Cassel & Co. Ltd., London: 1914.
- 3) Worboys, M., "The Emergence of Tropical Medicine: a study in the establishment of a scientific specialty". in *Perspectives on the Emergence of Scientific Disciplines*, ed., G. Lemaire et al. The Hague, 1976, 76-98. Worboys, in his recent piece on "Tropical Medicine" in the *Companion Encyclopedia to the History of Medicine*, edited by W F Bynum and Roy Porter, OUP, London: 1993, recognizes the problem when he says that pre-Mansonian medicine was characterized by "diseases in the tropics" rather than "tropical diseases". Unsurprisingly enough, this has led him to reconsider the mid-nineteenth century in quite the same way in his "From miasma to germs: malaria from 1850 to 1879" in *Parassitologia*, 36, Numero 1-2, Agosto, 1994. A pioneering and classic reexamination of the mid-nineteenth century is M. Pelling's, *Cholera, Fever and English Medicine, 1825-1865*, OUP, London: 1978.
- 4) Delaporte, F., *The History of Yellow Fever: An Essay on the Birth of Tropical Medicine*. The MIT Press, Massachusetts, 1991.
- 5) Harrison, M., *Tropical Medicine in nineteenth century India*. BJHS, 1992, 25, 299-318. The exception seems to be Anne Marie Moulin's, "Tropical without Tropics. The turning point of Pastorian medicine in North Africa" in *Tropical Medicine before Manson: Warm Climates and Western Medicine c1500-1900*, D. Arnold ed., forthcoming. Moulin's problematique is: was pastorian medicine very different from the medicine practised in the warm climates before 1880? Her answer seems to be: the pastorian over-emphasized the difference through the language of a scientific revolution, thereby building the myth of a radical difference that needs to be addressed. This in some senses is precisely what is being addressed: how tropical medicine was both same and not same before and after Pasteur/Manson. Any easy assumption of its existence prior to Manson as Harrison does (Harrison: 1992) (the title of Arnold's edited volume above also captures the dilemma perfectly), or its founding due to parasitology as an epistemic rupture (Delaporte), or Parasitology as a metropolitan entrepreneurial venture (Worboys:1976), fails to account for a number of things and seems to construct a genealogy that is problematic to say the least.
- 6) Macculloch, J., *Malaria: an essay on the production and propagation of this poison, and on the nature and localities of the places by which it is produced: ...*, London: 1828, as in Smith, D C. "The Rise and Fall of Typhomalarial Fever: I. Origins" *Journal of the History of Medicine*, 2, 1982: 182-220: p. 189; this and the subsequent piece, "II. Decline and Fall", *ibid.*, 3, 1982: 287-321, trace the evolution of the concept of Typhomalarial fever, which was a pervasive term for the description of the continued fevers.

- 7) Barker, T.H. *On Malaria and Miasmata and their Influence in the production of Typhus and typhoid fevers, Cholera and the Exanthemata, founded on the Forthegillian Prize Essay of 1859*, J. W. Davies, London: 1863; and for a version where climate, and particularly diurnal variations in temperature, is the *causa causans*, see Oldham, C.F. *What is malaria? and why is it most intense in hot climates*. H.K. Lewis, London: 1871
- 8) Foster, W.D. *History of Parasitology*, Livingstone, Edinburgh: 1965.
- 9) Foucault, M. *The Birth of the Clinic: An Archaeology of Medical Perception*. Tavistock, London: 1973.
- 10) *Ibid.*
- 11) *Ibid.*
- 12) *Ibid.*
- 13) Canguilhem, G., *On the Normal and the Pathological*. The D. Riedel Publishing Company, Boston: 1978.
- 14) Stokes, W. *Lectures on Fever*. Lecture I. Longmans, Green and Co., London: 1867. William Stokes (1804-1878), along with his colleagues Corrigan and Graves was more than the stock representative of the Irish school of Medicine at Dublin. Alison's student at Edinburgh, he was instrumental in introducing the stethoscope in the U.K. His two seminal works on the "Diagnosis and treatment of the Diseases of the Chest" (1837), and "Diseases of the Heart and Aorta" (1854), were celebrated works. Widely read and translated all over the continent, they brought Stokes a number of awards and titles. Founder of the Pathological Society of Dublin, he stepped into his father Whitley Stokes' shoes when he was elected to the Meath Hospital on the resignation of the elder Stokes in 1826. His "Lectures on Fever," were delivered in the theater of the Meath hospital. It was a general hospital which, as he says, "contain[ed] separate fever wards, but also wards for the treatment of cases other than cases of essential disease". Witness to all the major epidemics of the nineteenth century, Stokes was at the forefront of an extremely discerning assimilation and extension of all that was "progressive" in his time, as his works on the Chest and the Heart testify. But he did this as a clinician in a General Hospital. Hence his lectures on fever, hitherto neglected, are akin to his other work on the chest which was hailed as extending and correcting Laennec. He was not alone in seeing fever as an essential disease, especially from a clinical and therapeutic point of view. He, like Murchison in London, was a respected and uncontroversial figure, and like Alison and others held the view that there was a "Change of Type" in the very nature of Diseases, especially the continued fevers which, as Pelling argues, were by far the most important diseases in the nineteenth century. Pelling, "Cholera...", *op. cit.*, *passim*. On Stokes see, Sir William Stokes, *William Stokes: his life and work*, T. Fisher Unwin, London: 1898.
- 15) Stokes, W. *ibid.*; The anglophone version of the "local seat" as the primary and only cause of all fevers is offered by Clutterbuck. The difference is that for him it arises from the primary inflammation of the brain rather than the intestine/alimentary canal. See his, *An essay on Pyrexia, or Symptomatic fever as illustrative of the nature of fever in general*. Samuel Highley, London: 1837.
- 16) Longmate, N. *King Cholera: The Biography of a Disease*. Hamish Hamilton, London: 1966.
- 17) Stokes, W. *Op. cit.*, Lectures III and VIII.
- 18) Stokes, W. *ibid.* Lectures III, VI, VII and VIII.
- 19) Stokes, W. *ibid.* Lectures VIII. The demise of blood letting as a therapy round about the middle of the century has certainly not had the last word written on it as yet. The change in the character of the diseases and their very mode of presentation that Stokes alludes to, is a major argument put forward during the 30s and 40s and 50s for its demise. The fact that Cholera played no small part in ushering in a new style where, ostensibly, doctors continued to resort to blood letting to absurd limits, is captured in a waspish cartoon of that time: three fashionably dressed doctor-leeches attempt to bleed a fourth of their party already reduced to a skeleton. In this climate of "Broussaisism", it is not surprising that Brunonianism and his doctrine of the sthenic and the asthenic with most diseases as being or resulting in asthenia, where stimulants were the therapeutic mainstay, makes a resurgence: often, and this is interesting, without necessarily invoking him or his doctrines explicitly (the reason for this may well lie in the fact that the theoretical terms and the therapeutic strategies advocated by Brown were merely old wine in new bottles, not necessitating an invocation: see G. B. Risse's, "Brunonian therapeutics: new wine in old bottles?" *Medical History*, Supplement No. 8, 1988:46-62). The fact that Stokes was not alone in this

depiction and that neither was it an Irish phenomenon is borne out by the literature of that period. For a review where diseases in general and fevers in particular had moved once again to an asthenic presentation see the articles by Lester S. King: "The blood letting controversy: A study in the scientific method", *Bull. hist. med.* xxxv, no: 1, 1961; and John H. Warner's, "Therapeutic Explanation and the Edinburgh Bloodletting controversy: Two Perspectives on the Meaning of Medical Science in the mid-nineteenth Century", *Medical history*, 24: 1980, 241-258. In both these pieces Alison, the highly respected Edinburgh physician, speaks as the representative of the predominant position wherein it is the change in character from the sthenic to the asthenic (from epidemics of Typhus-asthenic – to epidemics of famine fever-sthenic – to Typhus again) that is held up as the reason for the demise of bloodletting: a change in character not only of the disease but also of the constitution of the body. For further discussions of this period, see P. H. Niebyl's paper on "The English Bloodletting Revolution, or modern medicine before 1850", *Bul. Hist. Med.* 1977, 51: 464-483 and the essay by W. F. Bynum, "Cullen and the study of Fevers in Britain, 1760-1820", *Medical History*, Supplement No. 1, 1981, which disallows easy and hurried closures. For an interesting psychoanalytical interpretation on its demise see K. Codell Carter's, "On the Decline of Bloodletting in Nineteenth Century Medicine," *Journal of Psychoanalytic Anthropology*, 5, 1982: 219-234. Its subsequent renaissance is mapped by Guenter B. Risse in his "The Renaissance of Bloodletting: a chapter in Modern Therapeutics", *Journal of the History of Medicine*, Jan., 1979: 3-22.

- 20) Stokes, W. *ibid.* Lecture VIII.
- 21) Johnson, J., *The Influence of Tropical Climates, More especially of the Climate of India, on European Constitutions; and the Principal effects and Diseases thereby Induced, their Prevention and Removal, and the Means of Preserving Health in Hot Climates Rendered Obvious to Europeans of Every Capacity.* London: 1815; Maclean, C., *Results of an Investigation Respecting Epidemic and Pestilential Diseases; Including Researches in the Levant Concerning the Plague*, London: 1817; Twining, W., *Clinical Illustrations of the More Important Diseases of Bengal with the Results of an Enquiry into their Pathology and Treatment*, Calcutta: 1828. Twining's book is a clear example of a post morbid-anatomy text which while paying close and detailed attention to change in structure and function of the affected organs, does not resolve causation exclusively in their favour; Martin, J. R., *The Influence of Tropical Climates on European Constitutions, including Practical Observations on the Nature and Treatment of the Diseases of Europeans on their return from Tropical Climates*, London: 1856.
- 22) Birch, E.A., "Influence of Warm Climates on the Constitution", in Davidson, A. (Ed.), *Hygiene and Diseases of Warm Climates*. Young J. Petland, Edinburgh & London: 1893.
- 23) Birch, E.A. *ibid.* p. 7.
- 24) Birch, E.A. *ibid.* p. 11.
- 25) Birch, E.A. *ibid.* p. 14.
- 26) Martin, J. Quoted in *ibid.* p. 4.
- 27) Fayrer, J. Quoted in *ibid.* p. 5.
- 28) Birch, E.A. *ibid.* p. 18.
- 29) Weber, H. and Foster, G.M (Ed.), "Climate in the Treatment of Disease", in Albutt, C.T (ed.), *A System of Medicine, Vol. I.* Macmillan and Co. Ltd., London: 1896.
- 30) Weber, H and Foster, G.M. *ibid.*
- 31) Weber, H. and Foster, G.M. *ibid.*
- 32) Weber, H. and Foster, G.M. *ibid.* In 1850, Philip, C. Williams propounded the acclimatization theory that a southward movement towards the tropics was more easily accomplished by the weak and the elderly as what was needed in the tropics was a less active respiration and circulation system which the weak and the elderly already possessed. See his, "On acclimation", The medical examiner and record of medical science. IXVIII: 1850, as in David Livingstone, "Human acclimatization: perspectives on a contested field of inquiry in science, medicine and geography", in *Hist. Sci.*, xxxv (1987), pp. 359-394. Philips' theory is the mid nineteenth century variation of Birch's theory on "perspiration, respiration and excretion" examined earlier. Philips' theory, like Johnson's before him and Birch's after him, produces the necessary figure of the anaemic/invalid in a tropical environment and, conversely, all such climates are "good" for invalids

and eventually invalidating for the healthy. For a representative work written with the Anglo-Indian in mind, see William J Moore's, *Health resorts for tropical invalids in India, at home and abroad*, J. A. Churchill, London: 1881. While it is true that not everyone saw the tropical climate per se as invalidating or fit only for invalids, as is borne out by Livingstone's review, it is quite clear from his review that the predominant position was one that was not favourable to the tropics: Sambon's reception is illustrative of it. One of the primary reasons for this, apart from the ones put forward by Livingstone, and which those who focus exclusively on the tropics fail to see, is that the preoccupation with climates and places as pathologic and healthy sites is ubiquitous, and the unsuitability of the tropical world partially arises from it and derives from the type of physiological doctrine that we have analyzed. Hence, Philips' theory is not in the least bit startling as it appears to Livingstone. Again, the growth of a new type of spa from 1842 onwards in England, and presumably the whole of Europe, testifies to the importance of climate as a mode of treatment, replacing in part the Grand Tour and of a piece with it. Here too the invalid, in the figure of the "nervous dyspeptic", whose presentation of the self is quite like the neurasthenic or the anaemic, is at the center of this narrative. See for example, Janet Browne's, "Spas and Sensibilities: Darwin at Malvern", in "The medical history of waters and spas", edited by Roy Porter, *Medical History*, Supplement No. 10, 1990, pp. 102-113. A lot could also be said about the principles that inform the therapeutic strategies at Malvern and the principles that inform the therapeutic strategies in the fever clinics of the same period. The striking parallels between the "douchers" and the "stimulators" in both these settings is the result of a syndrome: what I have called the "wasting body", whose symptomatological complex goes under different names: the "anaemic", the "asthenic", the "neuraemic", the "neurasthenic" and the "nervous dyspeptic". But that is a story in itself.

- 33) See, Haviland, A. "Medical Geography of Great Britain", in Albutt, C.T., Vol. I., *op. cit.*, c.f., Boudin, J. CH. M., *Traité de Géographie, des Statistiques Médicales et des Maladies Endémiques*, J.-B. Baillière, Paris: 1857.
- 34) Haviland, A., *op.cit.*. For a global version see August Hirsch's *Handbook of Geographical and Historical Pathology*, New Sydenham Society, London: 1883. c.f., Haviland's inaugural address on *Medical geography as an aid to clinical medicine*, delivered to the Isle of Man Medical Society, London:1897. An interesting therapeutic discovery, based on "Geographical" reasoning, is the discovery of the Willow bark for Rheumatic fever. Since Rheumatic fever was, like Malaria, thought to occur in low lying damp localities, MacLagan, like the Jesuits in 1630, who found the Cinchona bark in similar localities in the Amazon, sought the remedy for Rheumatic fever in damp low lying sites in the bark of the Willow tree (of the natural order of Salicaceae) from which he extracted the principle – salicin: MacLagan, T. J., *Rheumatism, its Nature and Pathology and its successful Treatment*, 2nd edn., Pickering, London: 1881.
- 35) Robert Felkin's climatological zones of equatorial Africa, and his later attempts to globalize these zones with the equator as the point of departure and altitude as the key variant is an aggressive "conquestorial" example of this general theory applied to the tropics. See Livingstone, *op. cit.*
- 36) Corbin, A. *The Foul and the Fragrant: Odor and the French Social Imagination*. Harvard, Massachusetts: 1986. Corbin is one of the first to systematically and elaborately pay attention to some of these "therapeutic strategies"; though for him it is merely part of a larger picture on the "social imagination of odour". Most authors who touch upon therapeutic regimens of the nineteenth century do so by merely listing them. The list is seemingly so exotic and outlandish that it is explanation enough. One "popular" example is Longmate in his *King Cholera*, *op. cit.*, where much of what he says escapes him. What seems to escape most commentators of the period (and Corbin's theme skirts this) is that such therapeutic strategies (as we demonstrated with blood letting) are the necessary and strategic obverse of the theories on the causation of disease which, as we continue to see, is a singularly necessary prelude to our "modern" theories of infection.
- 37) For a discussion of the terms, transubstantiation, consubstantiation and non-substantiation, and their importance in the constitution of the "mystery" of modernity as a discourse, see Uberoi, J.P.S., *Science and Culture*. O.U.P., Delhi: 1978. The history of medicine seems to show that the Zwinglian position of non-substantiation has only overtly won the day. But therein lies its power: public discourse may no longer admit of "alchemical" explanations.
- 38) Murchison, C., *Treatise on the Continued Fevers of Great Britain*, London: 1862. Murchison's "Treatise," was an extremely well received and popular text on Fever during its time. Murchison, after a stint in



India, was attached to the London Fever Hospital; the records of the Hospital were the basis of his "Treatise." c.f., Pelling, *op. cit.*

- 39) For precisely such a portrayal, in another account apart from Pelling's, on the central importance of putrefaction in disease causation and the way it ideologically divided the mid nineteenth century actors, see Christopher Hamlin's, "Providence and Putrefaction: Victorian Sanitarians and the Natural Theology of Health and Disease, in *Victorian Studies*, xxviii, 1985, 385-41. Leibig's zymotic theory, around which Hamlin's paper revolves, like Murchison's pythogenesis, posits a homology between the outside and the inside. And John Simon's syncretism is the predominant tendency. This is borne out most clearly in Pelling's "*Cholera, Fever, and English Medicine*", *op. cit.*, where she argues that any doctrine that offered to explain the cause of diseases in exclusive and "narrow" terms was not accepted by the medical profession at large and for very good reasons. She, and Hamlin thereafter in his "Predisposing Causes and Public Health in Early Nineteenth-Century Medical Thought", *Social History of Medicine*, V, no. 1, 1992, 43-70, argue that contagionism and anti-contagionism is not the primary axis around which the mid-nineteenth century debate over the etiology and pathology of diseases is to be understood. Murchison's theory of Pythogenesis is a classic example of a variation on the notion of what Pelling calls "contingent contagionism", which is the predominant position. Unlike Budd's exclusive doctrine for typhoid, Murchison's theory, like Fayrer's, is hierarchical: it subordinates and includes within itself specific and exclusive doctrines. One of the principal reasons why Murchison's treatise was very warmly received and was an authoritative text on Fevers.
- 40) Fayrer, J., "On the Climate and some of the Fevers of India", in Albutt, C.T. (Ed.), Vol. II, *op. cit.*, 1897.
- 41) Manson, P., *op. cit.*, see pp. 120-124.
- 42) Manson, P., *op. cit.*.



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