Thesis
Malarial Fever
Sutherland
March 1837
Malarial Fever

Part I

Etiology
Introductory Remarks

In choosing a subject for my thesis, as I have no original investigations to record, nor have devoted special attention to any particular department of medical science, I have been guided in my selection for consideration of what the special disease in the range of feverology might be, a thorough acquaintance with which would be of most immediate and permanent use to me in future life. My attention is about the diseases of India, and in the course of the East India Company's Medical Department, I have had an appointment to the service of the East India Company, and among them-stationing foremen at various stations, for its economy and utility, I have been left to investigate upon a fever, exhibiting itself in different forms with very varying degrees of intensity and recognized by different names, but essentially the same throughout, being due to one and the same cause, namely malaria. To an investigation of the nature, cause, and effects upon the human body, of this parasitic agent, therefore I turn, myself, the results which are hereby thrown together in the following pages, arranged as the causes, symptoms, and treatment of malaria, from which I refer as one disease including all the varieties of febrile affections to which malaria gives rise.
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Malarial Fever

Under this denomination are included all the varieties of fever, which I propose to treat of in the present Essay, whether more or less Intermittent, Remittent, or Contiguous, and which form a specific group, possessing the following characters in common:

1. They are all traceable to malaria, as their excitable or exciting cause, and are thus distinguished etiologically as being endemic and noncontagious, from the epidemic and contagious febrile diseases.

2. The febrile phenomena of all of them exhibit one or all of a parasymptom, characterized as a tendency to periodic remission and exacerbation, and are thus distinguished symptomatically from the idiopathic continuous fevers.

3. They are all subject in a remarkable manner to certain specific febrifuge remedies, hence named antiperiodic, of which quinine may be taken as the type, and are thus separable therapeutically from the continuous contagious and exanthematicous fevers.

4. They are all subject as a rule in the country, and avoid the crowded habitations of men, especially when there are aggregated together into towns and cities, and are thus distinguished by their habitat from the other fevers, which have their head-quarters in such places.

Strong reasons will be adduced subsequently, in treating of the Pathology of Malarial Fevers, for believing that the origin of intermittence of the one, and of contiguity of the
on the other of the symptoms of the different nosological forms of the disease, which is their most distinctive symptomatologic feature, depends not on any specific difference in their essential cause, the malarial poison, but on its degree of intensity, the quantity in which it is received into the system, or the susceptibility of the patient to its influence. It will also be shown in treating of the symptomatology that the different forms of the disease are essentially the same.

I conclude therefore that there is no good reason for regarding the different forms of malarial fever as specifically distinct, and that in the present state our knowledge they should be viewed as varieties merely of the same species. It will be time enough to separate them into distinct species, if we shall be able to determine hereafter as our means of investigation improve that there are different kinds of malaria, distinguishable by their physical or chemical properties, mode of generation or of action on the human body.

In conformity with this opinion therefore, I will not cause to be given a separate name of the various forms of intermittent and Remittent Fever, collectively, under the name of Malarial Fever, except when it is necessary to be more particular, in describing their distinctive symptoms and treatment.
I. Etiology of Malarial Fever

1. Latent or exciting cause of the disease. Malaria, synonymous with febrile, miasmatic, and exhalation fevers, is more commonly used to express the assumed febrile cause of the disease under our consideration, the supposed fever-poison whose absorption into the blood from the atmosphere, and subsequent deleterious action upon the system, the morbid phenomena which I will presently have to describe are produced. Malaria then is the miasm morbi which is believed to contaminate the atmosphere, as the secons when in certain places, malarial fever attacks the community. In one sense, the existence of this substance is quite hypothetical. It has never been revealed as a definite inorganic body, solid, fluid or gaseous, or as a specific animal or vegetable organism, but the sense of sight, though with the assistance of that most powerful aid, the microscope, our eye has been enabled to appreciate many extremely minute atoms, the existence of which would have caused greater wonder in our ancestors, than the discovery of a material malaria. Further, as the chemist, refined though the advance of his science has been in recent times, yet devised any appropriate or sufficiently delicate tests whereby to discover its existence or properties, if it be a peculiar gaseous matter existing in air or water. Nor has the most delicate in some respects gall our senses that of smell, which unaided by scientific instrument
I am often able to detect atomically minute impurities in the air which cannot be made apparent by the powers either of the microscope or of chemistry, always or even frequently impinged by any peculiarities in the labour of a malarious atmosphere.

Hence their reasoning from the analogy of other material poisons which are known to produce similar diseases in the human body, and because the hypotheses is perfectly consistent with and might indeed be independently inferred from the facts asserted to in regard to the circumstances under which the phenomena attributes to malaria arise, we believe that there is such a malarial agent, and that this material existence can be suspended in the air. Granting its existence, and we can point out some of its properties, state the conditions necessary to its existence and beneficial to its development, those which regulate its diffusion through the atmosphere; and describe as its effects the symptoms of disease, and speculate rationally as to its modus operandi upon the system.

This theory of the material existence of malaria being consistent with and explanatory of all or most known facts in the etiology of malarial fever, it is philosophical to accept and hold it to be contended or confirmed by subsequent discoveries. In conformity with this view the theory spread abroad to consider the laws which govern the existence, development and distribution of this malarial agent.
A. Conditions necessary for the existence of malaria or favorable to its development

1. Decomposition of organic matter, chiefly vegetable decay, perhaps also animal fermentation.

The decay of vegetable matter if it be at all a necessary condition of the existence of malaria, is far the most important of the other conditions. It is one of life's invariable facts, yet it is that condition which has been most disputed by authors on malaria. As I believe however that the great mass of facts are in favour of the view which regards it as essential, these places it first, leaving to be shown some process by which facts support it in this position, and the objections to attaching such importance but late answered subsequently.

The reason at which malaria pursues all over the globe from its connexion with vegetable decay. In temperate latitudes it occurs at the end of summer and beginning of autumn, in tropical climates during and after the rains which have followed a season of hot weather. These are just the periods of the year at which the vegetable kingdom, having arrived at its maximum of growth, is beginning to fade and yield to decay. This decay, once begun, goes on rapidly under the favoring influence of heat and moisture.

The geographical distribution of malaria over the globe is also consistent with the idea of its dependence on the vegetable kingdom. The nearer we approach the tropics from the temperate regions, the greater luxuriance does
The vegetation which clothes the earth's surface exhibits the same is it characterized by capacity of growth and decay. Parallels well with this change in the character of vegetable life, the Malarial disease increase in frequency and severity depending on the patient from the other regions where it is unknown to the countries within the tropics where it attains its maximum development. It may be objected to this argument in favour of the vegetable origin of malaria that heat and moisture which will be subsequently spoken of as essential conditions of its existence also increase in an equal ratio (I speak here generally in general terms) from the poles to the tropics, and that it is latter increase and not that vegetable life that the greater prevalence of malaria is due. I do not at all undervalue as will be seen when I come to speak of them, the importance of heat and moisture in the development of malaria, but I attribute it in great measure to their influence in promoting the growth of a luxuriant vegetation, and lessening the decay of its organic remains.

The geographical characters of the situations in which malarial fevers are prevalent, are such as one find associated with an abundance of vegetable decay. Such situations are the flat plains which form the bottom of the basins of great rivers as they approach the level of the sea, and the deltas where their mouths open into the ocean; more particularly if these river hands and deltas are, as is frequently the case, periodically inundated. These places furnish the conditions of the growth of the most luxuriant and edentent vegeta-
ation, especially with the Esquima, and their soil is alluvial, it is composed of the detritus carried down and deposited by the river consists of organic chiefly vegetable matter, mixed with sand and gravel. The superficial covering of the earth's surface which was found wherever vegetation exists, is greater at present, cal. led vegetable mould attains in the alluvium its greatest depth. Other situations in which malaria is life and often associated with those already mentioned, are swamps and marshes, formed either by the periodic inundations of rivers or the great fall of the wet season of the Esquima. Here when once or if completely dried up during other periods of the year are also the seat of rank vegetation, which dies and is covered over with water when they are inundated, and so thus prepared for rapid decay when again exposed to the influence of the sun and air. Salt-marshes formed by the occasional influence of high tides on level lowlying sea coasts, and the banks of rivers that form long estuaries and are subject to the elevation and depression of their waters of the ocean, tide fields, and meadows cultivated by artificial irrigation, newly drained, or canal, ponds or shallow lakes, the earth thrown up from shallow, cut through marshy ground, or rich vegetable mould turned over. For the first reason or two in the cultivation of a newly in- habited district of country, all furnish vegetable decay as a condition of the malaria which is known to emanate from them.

At such situations as those above mentioned are those in which malaria most abounds and produces its most fatal consequences is such a well known and indisputa
fact that it is almost unnecessary to cite examples, in proof. The banks of the Scheldt in Holland, the mouths of the Rhone in France, the banks of the Danube in Hungary, the Delta of the Mississippi in America, the Delta of the Niger in Africa, and of the Yangtse in Asia, the low grounds of Kent, nowadays London, Essex, Lincolnshire, Cambridgeshire, and Suffolk, the low level coast of Holland from the island of Walcheren and South Beveland on the South & Frisland and Groningen on the North, the Venetian and Romano Territories in Italy, especially along the whole track of the Compoine Branch, the margins of the Gulf of Mexico in America and many part of the West Indian Islands, are all attributes for their as the seat of frequent and fatal endemic disease. Last as the type of a material locality, both in regard to its physical character and the danger approached, if I will quote a description of the right of Benin on the west coast of Africa, by Daniel, the shores of this part of the Gulf of Guinea are described by him as "the vast alluvial plain, and densest wooded forest, extending over an area of at least 10,000 square miles, partially irrigated by the Atlantic tides, intersected by numerous rivers and creeks whose muddy banks are universally overflowed. At the distance of several miles from the coast, the peculiar odour arising from swampy exhalations, and the decomposition of vegetable matter is very perceptible, and sometimes even offensive."
Sitches of the Medical Geography of the Gulf of Guinea, Western Africa of W.J. Amell M.D. Atlantic Jun. 1829 p. 13
wherever vegetable life most abounds on the earth's surface, we find that, in accordance with the wise law of nature which makes every portion of her creation interdependent upon another, and by a beautiful adaptation for the preservation of the chemical balance of the atmosphere, animal life also is increased in proportion. It follows therefore that as animal life in vegetable life and die that, where we have most of the decaying remains of the latter, we must have also the most of the decomposing dead bodies of the former. But as all the parts of animals except their bones are more rapidly reduced into their chemical elements, than the ligneous fibre which constitutes the bulk of plants, the animal remains, if they were exposed in as large proportion as plants, would not form so large a part of the organic matter of the world, except in the soil of the earth's surface as the remains of the vegetable kingdom would, and therefore could not contribute so much to the generation of malaria. This it is not improbable that decaying animal matter may have a considerable share in furnishing the condition of decomposing organic matter in the soil which I believe to be one of those necessary to the existence of malaria. This view is in accordance with the opinions of two of the greatest authorities on Tropical Climate. The writers on Tropical Medicine, say James Johnson have generally insisted, especially since Bancroft's essay appeared, that animal matters have nothing to do with the poison of terrestrial exhalations, he has always been of a different opinion and the following passage shows that...
we have Dr. Homeick on our side: "A most important cir-
cumstance, which goes far to account for the much greater
imhealthiness of insect and manly situations in warm coun-
tries is the quantity of animal matter, in a state of decom-
position which they present. The same circumstances which
cause vegetation quiet and luxuriant, tend also to gen-
erate immense swarms of reptiles and insects, the exuviae
and dead bodies of which, mingling with vegetable matter
in a state of decay, and combining with moisture give
rise to microbes of much more noxious description
than those resulting from vegetable decomposition and
moisture alone. In the course your experience in warm
climates we always have considered the number of insects
and reptiles with which a place abounds as more indicative
of its imhealthiness than any other circumstance.
The decomposition of organic matter, one of the most impor-
ant causes of disease which we have any knowledge
of, is very likely that besides being the constant cause
under favorable circumstances of malaria and the im-
portant group of febrile diseases dependent upon it also
though incapable of directly generating them furnishes the
food or means of development of the poisons, when conveyed
to the bodies of persons or animals, of several epidemic dis-
cases such as Cholera; and perhaps of the contagious con-
tinued fevers. Certain it is, that by contaminating the at-
mosphere, it becomes an important predisposing cause
of epidemic and contagious diseases in those who live
in air impregnated by it.
11) The Influence of Tropical Climates on European Constitutions


It is important to define chemically the exact nature of the process of organic decomposition which is a necessary condition of malaria. I think it is most probable that process which is described in the following quotations from Dr. Fogg’s Chemist: “The second form of slow oxidation is that which is commonly called decay, but while Liebig proposes to call it ‘harmoanosis’ (i.e., slow combustion) and which takes place when organic matter is exposed to air and moisture, in dry air it does not occur, one of the most familiar examples of this kind of oxidation is that decay of wood by which it is slowly converted into dark brown powder, charcoal.” “It is greatly promoted by heat and by the presence of alkaloids. It is on the contrary arrested or retarded by cold, dryness, acids, and many salts, such as coramino-lactate, which has been used to prevent the decay of wood.” “There is one circumstance connected with the process of harmoanosis, or decay, which is worthy of special attention. It is that a substance in a state of harmoanosis, if placed in contact with another which is capable of undergoing the same change, speedily causes the latter to enter into the same condition of change. This effect appears to be due to the communication of motion from the particles of the decaying body to those of the other substance, which motion, as in the case of fermentation, overthrows the existing balance of affinities, unstable acids on organic compounds and gives rise to the formation of new products. The process of harmoanosis or slow oxidation in the atmosphere...
is one of very great practical importance, inasmuch as
by this means, the elements of dead organic matter are
made to assume those forms, namely, the forms of lactic
acid, water and ammonia, which they are capable of
contributing to the nutrition of new or growing veg-
etables. Fermentations, in which oxygen is absorbed, are ex-
amples of cremaeous, and it has already been mentioned
that a body in a state of cremaeous acts on other bod-
ies as an excitant of the same change that is as a fer-
ment. Indeed most ferments whether they induce cremaeous
or more forcible metamorphosis in other bodies are them-
delves in a state of cremaeous, still events in the
commencement of the change."

I do not think the process of putrefaction is important
in the production of malaria. His chiefly chemical
metamorphosis of organic matter and takes place in the presence of mois-
ture, independently of atmospheric contact. Recent animal
carcases, in a state of moisture undergo this putrefactive
metamorphosis of their tissues, which gives rise among
others, to gases composed of sulphur and phosphorus which
are known by their offensive odours, as sulphuretted hydrogen
and phosphuretted hydrogen; but in contact with the air,
their decomposition always generates large cremaeous
and after long exposure consists almost entirely of that
process. Vegetable matter also, when it is excluded from the
air, and abundantly supplies with moisture, as when it
lies under water, also in the state of mines, also under-
goes putrefaction, producing gases such as marsh gas
Outlines of Chemistry by William Gregory, M.A. Professor of Chemistry at the University of Edinburgh, 2nd Ed. 1847, P268, 269, 276.
and alveolar gas, these constituting with air the fire-damp of the mines, and carbonic acid gas, called clothe-damp. I think it is most probable that the decomposition of organic matter by the process of fermentation, exclusive of the process of putrefaction proper, is one of the essential conditions of the development of malaria, and that this mineral material either owes directly its existence or at least its means of subsistence and development to the products of this process. This is no doubt a mere hypothetical conclusion, but that it is borne out by many facts will be seen as we proceed.

This is the best place perhaps to mention the grounds on which it is supposed that the decay of animal or vegetable matter is not at all essential to the development of malaria. The putrefaction of animal or vegetable matter is naturally a very frequent concomitant of the process by which the person is thus developed, but the facts stated by Chisholm and Ferguson seem insufficient to show that it is not an essential part of the process.

"Crozet states that in 1759 animal afflues were abundant in the dry and elevated parts of Cleveland in Yorkshire, which is generally regarded as a very laborious district. Townsend found tertians in the Sierra Morea, where there were no marshes in the vicinity. Some represent the few meadows by channels of brooks in Seville, the highly productive plains and eminents in their island, and Williams and Ferguson inform us that guers prevail in many places in which nothing but dry rocks with

121 On the nature and distress of the Island of Oban of William Ferguson M.D. Lea. Edwin Philo. Lane. vol

3 Outlines of Pathology & Practice of Medicine of W. A. Stein in his 3rd Roy. Act. of Physic in University of Ed.
feels great pain. Lyraeus moreover states that ague and intermittent fever prevailed very extensively in August 1794 in the British encampments of Bolonthal and Portaout in Holland, where the soil was a level plain ground, without vegetation except a few stunted heath plants, but extremely permeated with water, not brutish but clear and steady. The Plenteus land on the ridges of Taş, which is also a sandy level flat soil in the manner extreme productive of autumnal ague and the symptom of empyema, an extensive land of dry open gravel, was on the summer of 1807 extremely productive of fever to the troops quartered in the bastions and Fort Armare. In this district, even exempt from the disease. Among such places as Ciudad Rodrigo, St. Victor and Malaga Jédrjasen but the rocky shores islands of the Mediterranean Provinces Minorca Sarkinia Sicily, Cephalonia and all the Cyclades abound as much in autumnal fevers as the most level parts of Holland. Sir John Aplin thus describes a part of Dutch Bremen in Germany, which he says, a fever broke out and became as frequent as any which had hitherto afflicted the room. It was thus accounted for. This part of Bremen is nearly as flat as any part of the Netherlands, the only inequalities being some sand hills and measurable slumps which give the advantage of a few feet in height to some of the villages. The soil is a barren land and has little water in even that at first sight the country might seem the dry and healthful. But this appearance is deceitful, for water is seen that at first sight the country might seem the dry and healthful. The ground at the depth of two or three feet is in a profound

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When 400 distance from the surface the inhabitants are free from disease.

It does not appear true that many of the facts mentioned by Simpson and Nicholson or John Bell and others clearly prove the presence of decaying vegetable matter, in certain situations where malaria exists, some of the instances cited as examples of them, of which I have already quoted. It is not necessary that such decaying matter should be abundantly apparent on the surface of the soil in order to prove its presence. It is very difficult to conceive that there is any part of the superficial soil of a district half the size of organic matter. In many places in a soil consisting as far as the eye can judge of fine land grass will grow showing that it must contain materials besides pure soil. Again allowing that the superficial soil be pure land there may be a deeper layer consisting of a silt or vegetable mould. Besides in all the cases mentioned even where the surface was dry, the soil was light and porous and contained abundance of moisture far from the surface, as in the case of the fiuman, the water entering the surface ran in channels, and caverns underground. Now the water in all these cases may have become impregnated with organic matter by permeating through the soil, from other situations. It is not intended that a great quantity of decomposing organic matter is requisite to generate such an amount of malaria as is capable of inducing on the contrary from the manner in which the substance has hitherto
Sir John Angle on the Diseases of the Army 7th & 8th 1774.

Philadelphia Journal of Medical & Physical Sciences XI 274.
etc. To all our means of observation, it is highly probable that
whether connected with organic decay or not, its quantity at any
time in the atmosphere must be very minute and its char-
acter extremely subtle, and that the absolute quantity of
decaying matter required to generate it, would be proportion-
ally small. A chemical examination therefore of any soil
would be unwise before it could be declared that it did not
contain sufficient organic matter for malarial genera-
tion. Indeed, says T. Hood, "the microscope has just open an
otherwise invisible organic world in which all the change,
with which we are familiar in the visible may take place
beyond the cognizance of the senses, and lead to aerial
contamination inconsistent with health. In few in-
stances therefore in which malarial fevers have pre-
vailed without an obvious possible source in vegetable
fermentation we may well infer that such a source
neverthelass has existed, because in the great majority of in-
stances these diseases can be clearly traced to that cause.
It is probable also that in some of the instances quoted
against the organic origin of malaria, the possibility of its
conveyance from a distance by aerial currents may not
have been sufficiently investigated. We shall see in the course
of our investigation that the property of being transported
beyond the immediate reaches explains many anomalies in the history of malaria.
McCulloch states that it may take effect at a distance
of 7.5 or 6 miles from its source. (12)
As Baedeker in an article on "Ammittant Fever of the heat-country
Africa in the London Medical Journal for the present month (1856).
remains. It has been assumed that malaria proceeds from the decomposition of vegetable matter; but have been convinced fever attacks a party of men when encamped on a dry gravelly river bed with hardly a trace of vegetation near, and take there as severe as it could be in the Delta of an African river. In this case the soil immediately beneath the gravelly bed was most probably alluvial subsoil in organic matter, a very rare case in the neighborhood of a river bed such as this one. The very far-off and examples cited against the vegetable or organic origin are in many cases too vague, and superficially observed, and as little investigation made as to the character of the soil below the surface, and the surrounding country for several miles, and as little the state of the atmosphere, that they are really of little or no value, and cannot be taken as an argument of sufficient weight to take the first mass of facts which have been collected on the other side.
F. Insolence. This is an undistinguished condition of the excellence of malaria. It is essential to the process of schematic or vegetable decay. It exists abundantly in all the situations I have enumerated as prolific of this decay, and is also admitted to be found in those soils in which the presence of decay has been denied. Much confusion has arisen from the error of supposing that the moisture which is necessary for the generation of malaria must exist in the form of marshes or swamps, and this in consequence of the terms marsh fever, paludal exhalation being used as synonymous of malaria. On the contrary it has been clearly proved that an amount of water sufficient to cover completely the surface of a portion of soil containing all the elements of malaria, prevents the extinction of that poison from the soil as long as it remains thus covered. This is easily explained on the theory of schematic decay, because the action of the oxygen of the air upon organic matter is necessary in order that that process should go on, and so long as the air is excluded by a layer which it cannot cross, it may also be explained of the strong attraction of malaria for moisture (which will be presently alluded to as explainatory of many of its properties) in consequence of which it is absorbed by the water as soon as it is formed, on the assumption that it can be generated under water. The relation therefore which moisture bears to the generation of malaria is this. A soil containing the elements for the formation of the poison, enveloped by the leaf of a marsh, swamp or inundation, must be exposed to the action
The air at a certain elevated temperature, by the drying up or draining off of the superfluous water from its surface, till it remains only more or less saturated with it, or if previously mere moistened or saturated it must in the same way be exposed to heat and air. From the time that a soil is exposed under these conditions, until it becomes completely dried up, malaria is formed and exists in an abundance proportionate to the persistence of the various conditions mentioned. The opponents of the organic origin of the poison maintain that it is simply the process of desiccation of previously more or less moistened or saturated earth, which is common or other essential and sufficient for its production. Another example might be adduced in favor of the fact that a covering of water prevents the generation of malaria and that this takes place as soon as the soil is exposed to evaporation, or that it takes place in connection with marshes, swamps, and shallow lakes, not from the surface cover of water, but from the drying margins. That malaria should be given off in greatest abundance from such places as are subject to periodical inundations of rain or river water, is explained by the fact that the soil in such places is most productive in vegetable decay, from its being in most cases alluvial, the seas and vegetation when not inundated which being in preparation for rapid decay if lying covered up for a time of water, undisturbed generally near the level of the sea where for reasons hitherto be mentioned malaria is most concentrated.
St. George states that the town of Castries, at the bottom of the
Aronage of the islands of St. Lucia, a town esteemed in a
deep mangrove fen became perfect healthy under the per-
iodical rains, while the garrison on the hill of Morne
Fortune immediately above it began to affect with e-
constive fever. An uncommonly rainy season at Barbados,
which failed in all perfect dry and well drained
country to induce for a time general sickness, while Sim-
ilarly, the centre of which may be called a wet or damp
swamp, has always rendered more sickly by a cessation of the
growing rains. These cases show that the same rains which
center one island healthy are the hardening of disease in an-
other, and that even in the same island in neighboring
localities they have the same opposite effect upon the life
and body. This would appear a very extraordinary
and almost incredible fact were it not explained by the
circumstances that a covering of water prevents the gen-
eration of malaria in the soil below and that the same
rain which provides this covering for low grounds, mere
ly conserves the higher, as to place them in the proper
malaria-producing conditions. Thus any low rich and
swampy district remains free from light and clear of the
insects which is transmitted during the rains or monsoons, and dies up as the
late season, shall during the time that it is completely
under water be perfectly healthy as respects the European
constitution, but as soon as any gets surface becomes
exposed after the rains then agues appear and when its
whole surface is acted upon then fever ga more
were and dangerous type make their appearance. At Boccaur when the flood at the head end of the town were drained in 1878 an epidemic of typhus broke out, and died 1200 men whose 3000 died in five months. Sir John Bingle states that “the moisture and corruption of the air (in the Cantoneaux in Vaithe Lulfant in 1747-8) were much increased by the inundations (which had been made about the fortified towns since the commencement of the war) and sensibly became more noxious upon letting off part of the water in the beginning of summer after the preliminaries of peace were signed. For these grounds which were once entirely covered being now half drained and marshy, filled the air with moist and putrid exhalations the state of Holland being made sensible of these by the riddens which rages at Breda and in the neighboring villages gave orders that in the water again and to keep it up till winter.
moisture, besides being a necessary condition of the existence, also because it is essential to the process of generation, or for some other reason appears to be also necessary, for its conversion into and suspension in the atmosphere, and thereby renders it to exert its deleterious influence on the human frame, and by admitting its connexion with malaria we are enabled to explain many of the otherwise apparently anomalous properties which the latter exhibits. In other words, malaria has a strong physical or chemical attraction for water, which it latter maintains when the water by which it is attached assumes the form of vapour, and rising into the air out of the ground takes the shape of mist, fog, clouds or is again precipitated to the earth as dew or rain. As the aqueous vapour under the influence of the sun's rays evaporates from the surface of a saturated malarial soil, the fever poison rises with it; as this vapour falls along or hangs over the surface of the ground in the condensed form of visible fog or mist, this poison proportionally concentrates and becomes dangerous in the cool of the morning, as the vapour becomes condensed and ascending into the air is rendered invisible by the heat of the rising sun. So is malaria dispersed and diluted with the surrounding atmosphere, and is rendered comparatively innocuous as the heat of the day increases towards noon; as the vapour again becomes condensed in the cool of the evening and descends in the form of dew to the surface of the earth, along with it the fever poison once more approaches the ground in a
concentrated form, and it becomes dangerous to subjects to its influence as the sun goes down. As winds between two layers of clouds, and after forms of aqueous vapour, conveying them gently along in a steady current in certain directions, or suddenly and roughly scattering them through the air; so is malaria carried along in a regular column by a gentle aerial current from its source to a considerable distance, so as to be able to make a strong impression when it arrives there with its atoms still pretty concentrated; or it is roughly dashed along and dissipates in the surrounding air if a strong wind or hurricane, so that with its forces thus dispersed, it can make but a feeble attack, after a very short march. Such is a rapid sketch of the manner in which many of the phenomena of malaria may be explained by its attachment for anesthezia. These phenomena can be easily understood intuitively through the sense of sight, by observing or recollecting the manner in which fog sometimes rises from the surface of the ground in a calm morning, along the course of streams through a valley, or around the margins of lakes lying within a basin of hills, before the light of the sun has attained sufficient strength to disperse it. The most beautiful example of this I ever saw, which made a great impression on me at the time, was in the neighbourhood of Kertet, in the end of the Autumn of 1853. The regiment with which I was attached was encamped near the summit of one side of a low range of hills outside the town, which is built around
the extremity of this range where it subsided into the sea on our right. Below and in front was a bread flat valley nearly on a level with the sea and crossed with natural inlets in wet weather. Opposite our camp about two miles distance was another low range of hills, converging in the distance towards left towards the range we occupied. On the opposite range of hills, about the same elevation, more the plain as that your position was a mosque with conspicuous white walls, which being occupied as a lookout your cavalry was called the white Mosque House. On the activity below us but alone the level of the flat was a Tartar village, of scattered hamlets, into espesio with rude windmills. I got up soon after day dawn the morning after we pitched in this situation. It was very calm and frosty. In looking out I could scarcely believe my eyes. Had I last seen the country the night before, I would certainly for a few moments have imagined that we were in the borders of a vast lake, the surface of which was as smooth as glass. Its margin seemed breach to the opposite hills and was clearly defined some distance below the white Mosque house. The Tartar village was invisible. Some of the windmills here and there stretched their arms through the otherwise unbroken sea of mist in the most picturesque manner, resembling fragments of submerged ruins. I was so delighted with the view that I hastened to wake a friend to see the illusion, but the enchantment was soon dissipated. A gentle
huge blew over our hill across the smooth surface of the fog. It was soon elevated into rough waves, and presently large banks of it separated from the main and floated up the opposite hills completely enveloping and concealing at intervals the white Aigret House. The windmills gradually came into view, and at last the whole village and plain below were distinctly visible. The scene was completely changed. I have often observed the appearance of mist hovering over the surface of low lying places, but I never saw it so smooth, regular, and clearly defined as on the scene I have endeavoured to portray. The idea of melancholy occurred to me. The manner of its disposition suggested how the Tartar village which was buried in the fog might have been attacked with fever had the fog been impregnated with malaria, while those in our situation above it would have been exempt. Had there even been some stories of the houses in the village of the same elevation as those arms of the windmills which projected through the mist, those sleeping in them would have escaped. Our friends in the White Aigret House would have been exposed to the vapours which blew over them from the plain below, while we, though about the same elevation above the source of the poison, would not have suffered so long as the wind continued to blow in that direction. In this instance I saw the physical properties of visible vapour presented to my observation, we have only to conceive an invisible vapour, chaotic
with an invisible morbid material, but regulated by
exposition and diffusion just as distinctly and certain
physical laws, and we can understand a great many
of the properties and phenomena presented by malarias.
I will now proceed to examine these more in detail.

The more heated the air is with moisture, the more is it rife with
malarias. "But this is the case," says Sir James Annesley, "as shown by the prevalence of those disorders
which proceed from this cause, during still and moist
stages of the weather, particularly in warm climates, and by
their total disappearance before dry winds. It has been
frequently remarked on the coast beck of Africa, where the
endemic causes of the same are under consideration are
most abundant, that of the harmattan wind, which is most
remarkably dry, follow a still and moist stage the air,
all the diseases proceeding from the terrestrial eman-
ations accumulated in consequence of this state of the weather
rapidly disappear, and similar occurrences are very remark-
able kind occasionally experience in all warm climates.

Malaria is more concentrated in the early morning and
evening than during the heat of the day, and is most ef-
when the temperature falls lowest, at night. The reason of
this has already been alluded to. The danger of exposure to
the night air is too well known in all tropical climates
To require any proof. In some of the most malarian lo-
calities, of the west coast of Africa for example, it is reputed
even certain death to an unacclimated European.

It is also known that in the case of persons being
On the Diseases of India P. 30
Necessity thus exposed, those who go to sleep are more certain attacked than those who remain awake. There may be something in the condition of sleep predisposing to the influence of the annuliferous agent, but I think it is probable that the greater liability of those who sleep depends on their lying down upon the ground, and therefore breathing a lower stratum of air in which the annuliferous is more concentrated, than those who sit up or walk about to keep themselves awake. In connexion with this subject I may notice an important fact stated by Dr. B. B. Baird in his paper recently referred to, in regard to malaria. "The materialism is further proved by the protection afforded to persons sleeping the night in swampy districts by wire gauge, or even by a thin mosquito curtain, under the cover of which sleepers may usually expose in almost perfect safety, the fine structure seeming to act like the safety lamp of the miner, in preventing the ultimate atoms of the poisonous gas from passing through the minute network, and so reaching the individual." The correctness of the remarkable fact thus stated by Dr. Baird I do not mean to doubt, but his explanation of it I conceive to be quite erroneous. In the first place Davy's safety lamp does not prevent explosions by its wire gauge, but permitting the ultimate atoms of the inflammable gas or fire-damp of the miner from passing through it and so reaching the flame inside. The gas does pass through the gauge and takes fire inside the lamp, but the flame which it produces inside is pre-
entire from setting fire to the gas outside, in consequence of becoming cooled by contact with the metal below the point at which it becomes luminous. For as it acquires the heat of flame which is mean下属 gasous matter to set fire to the explosive gas, and as the flame inside the wire gauge, becomes as cold as contact with it that it cannot pass through it as flame, but merely as gaseous matter not mean下属ent, it follows that it cannot set fire to the inflammable gas outside.

Neither do I think it possible that such a substance, as it is, would actually, as it has eluded all our means of perception, escape, even though it be not strictly speaking gaseous, be arrested by the meshes of the finest wire gauge or mosquito curtain. It just strikes me that if these substances pass a such a power of arresting malaria, it may possibly be explained by the connection of this passion with moisture, on the same principle as the action of damp cloth, lamp. It is not improbable that the wire gauge may be cool the malaria-bearing vapour when it comes in contact with it as to cause it to be deposited upon its meshes in the form of dew and so, prevent it passing through it and in course of time the malaria at the same time.

And it may not be thought impossible that the mosquito curtain can act to a certain extent in the same way, when we recollect how the dew drops glitter in the sun on a summer morning, when there is as brittle vapour in the air, upon the otherwise almost
imperceptibly attenuated filaments of a spider's web.

Dr. Wood of Philadelphia mentions that he was formerly the
attending Physician of a public Institution, containing more
than 1,000 inmates, among whom during the early
season previous to which the vicinity was subject, antimonial
juice was very prevalent; till the direction was given
and carried into effect, not to allow any one to go out
before breakfast or after tea.

The greater the elevation of a situation above any certain
comers of malaria, the less cases are its
effects felt, as a general rule.

I quote the following, from Dr. Jefferson. "The island
South of the Autumn of 1806 became very sickly and
yellow fever broke out in all its low marshy places
while the milder remittent fever adv to the island generally.

The British Garrisoning English Harbour soon felt the in-
fluence of that most unwholesome place. They were dis-
tributed on a range of fortified hills that surmount
the Abayard. The principal of these, Mount Hill at the
bottom of the bay rises perpendicular above the mas-
ches 500 feet in height, 600 feet wide. The other Garrisoned hill
that goes by the name of the Ridge is about 400 feet
baser but instead of rising perpendicular, it slopes
backwards from the swamps of English Harbour. It
was the duty of the white troops in both these forts
to take the guards and duties of the Abayard amongst
the marshes below, and in perpetual risk their atmos-
phere, that it often occurs too well becomes colder.
mounting the night-guard in perfect health, the scene
with furious delirium, while standing during and when
exposed to this harassing service Montes Hill, sepulchre all
the lepers of the black vomit within less than thirty days
from the first attack, but during all this not a single case of yellow fever, nor four or any kind occurred to the
inhabitants of Montes Hill, that is, the garrison staff,
the superior officers, the women, the Drummers, all in
fact who were not allowed to keep out of the garrison
to take the whites below, remained in perfect health.
The result on the Ridge was not quite the same but
was equally curious and instructive. The abating soldiers
in number never took any of the yellow fever, but
they occupied a barrack about 300 feet above the
marches, not perpendicular above the town of Montes Hill
but a little above. For a case of yellow fever collected
among them, but every man without
a single exception suffered an attack of
ordinary
Remittent which one of them died. As at the Barrack
on the top of the Ridge at the height of 200 feet and still
further away from the marshes, there never occurred
any fever worthy of notice. This instance is instructive
in many points. It shows the danger of proximity to the
source of malaria especially at night. In the instance
of the type of the disease its absence, in proportion the
degree of elevation above that source.

It is well known to the inhabitants of Italy not all
who have traveled in that country who have been
any time within the tropics, that elevation above the
beaches whence malaria proceeds furnishes exemption
from its influence and that the exemption is in propor-
tion to the height of the elevation. In many districts of Italy
and Greece the villages are built upon elevations of
hills rising abruptly above the surrounding low ground
in order to avoid the miasmas which they generate.

Sage, which is beyond the reach of malaria, is about
300 yards above the Pontine Marshes, and Tivoli
which is elevated about 120 yards above Rome is much
healthier than this city. According to Humboldt, Greece
situated above Zera-Breg is not affected by the diseases
which center this port and its adjoining coast is
much healthier. This writer states that 920 yards, the elva-

The writer states that even the elevation
of one floor is sufficient to afford a very great exemption
from the diseases arising from terrestrial exhalations.
He finds that the number of cases of fever occurring
in the ground floor of the barracks near Kingston in
Jamaica were in relation to those affected on the first
floor as three to one. Similar facts say Sir J.F. Constable
have come under my own observation in various parts
of the East. In order to explain the effect of elevation on
the concentration of malaria, it has been supposed some
among critics to deny that it has itself a peculiar
attachment for the earth, but there is no necessity for an.
On the Diseases of the Eye
Downing it with any such property beyond that example, granting the effect of which if any at all must be extremely slight, when all the facts and many others can be very well explained if its relation to moisture. The influence of elevation above the sea or malaria on a more extended view, will be considerate subsequently. Certain apparent exceptions to the beneficial effect of elevation above the cause of malaria will be explained in connection with the influence of winds in conveying malaria. A calm still condition of the atmosphere is favorable to the accumulation of malaria, as it leaves undisturbed the moist air in which it dwells. Winds on the contrary in proportion to their violence, exert a salutary influence by mingling and diluting with the surrounding atmosphere. The circumstances of portions get as have become saturated with moisture and charged with malaria. Jefferson is of opinion that the west Indies would be uninhabitable were it not for the trade winds. Then this salutary breeze is interrupted through circumstances strange or intervention which kills the consequences are most fatal. The leeward shores of Martinique and Guadalupe, which are sheltered by abrupt ridges, hills are uncomfortably pestilential, though they do not present the terrestrial conditions of malaria in a more marked degree than other parts of the islands. It has generally been observed in tropical climates that the most severe epidemics have been preceded by an unusually long absence of hurricanes and thunder storms. It is probable that were
not such atmospheric commotions to occur frequently in the Tertid Zone, neither man nor beast could endure the potential condition of the air which would ensue. It is a remarkable fact that this zone which is, after all, the Earth's surface in those conditions of the atmosphere which promote the generation and accumulation of malaria, is also that part of it which is most subject to violent aerial agitations and electrical explosions.
It follows from what has been said that the more sheltered a situation be, provided it contains within itself a source of malaria, the more contaminated will it at atmosphere become. For instance a place surrounded by hills, which not only protect the air within them from wind, but also confine the malaria, prevents its diffusion must become, either gradually, the most unhealthy. A cliff in such a circle of hills or a valley connected with it, most abode very dangerous. Since they would serve as it were as conducting tubes to convey away the malaria, more particularly if it were inclined towards them by a current of air. In the other land the more sheltered a place is from winds which blow over it, from malarious sources. If it does not contain such a source itself, it may be protected from the injurious influence of such winds, and the more healthy in comparison with other places equally near the seat of the source, which are not thus sheltered from it.

If malaria is transported attached to gaseous vapour by wind, it will depend in a great measure not on the direction in which they blow, what place with vicinity of its origin will be affected by it or exempt from its influence. When there is a totally still
And steadily current of wind blowing in a certain direction, places toeward of a malarial-generating portion of ground will be quite safe against malarial disease, while those landward of the malarial fume will be quite safe. But should the direction of the wind change the order of things will be exactly reversed.

At times where there is no determining current of air, the malarial moisture probably spreads out and diffuses itself in the directions in which it meets with least restraint from the conformation of the locality.

Lancisi mentions a remarkable case, showing the influence of winds in carrying malaria. While thirty ladies and gentlemen were sailing on a pleasure excursion to the mouth of the Tiber, the wind [blank] shifted to the South and blew over a malarious tract of land. Twenty-three of these persons were in consequence attacked with tertian ague. Humboldt states that the island of Corsica is subject to intermittent, among the prevalence of the West winds which blow over the Durance of Campania.

Mr. Boyle states that intermittent and remittent fevers prevail at Zee Town in Surinam, after the first rains, when North-East winds blow and convey malarial fumes from the Paroon shore, or North Bank of the River.
A Practical Medical Historical Account of the western Coast of Africa by James Boyle M.D. C.S. Colonial Surgeon to Sierra Leone.
As malaria is attracted to moisture, it is absorbed by water in its passage over it. Consequently separation from a miasmatic locality by a certain distance of water confers immunity from its influence, even though the direction of the wind should be favourable to its attack. This is frequently exemplified in the case of ships lying off malarious shores. So long as they remain a certain distance from the land, their crews are safe. Sir John Hingle mentions the following instance. "Brigadier Mitchell's Squadron, which during all this time (Campaign of British Army in Dutch Brabant in 1797) lay at anchor in the Channel between South Beveland and the island of Zuidereiland on which places the epidemic fever raged most viciously, was neither affected with the fever nor the flux, but consider all that sickly enjoyed perfect health; a proof that the moist and stagnant air of the marshes was dispelled or corrected before it could reach them." P. 57.

Ships have been observed to remain quite healthy within 1000 yards of shore even to windward of them, where the disease was very prevalent." Persons living near a lake, the opposite side of which is malarious enjoy the same immunity, the opposite banks of a river are differently affected in the same way.
Rain disperses malaria in its passage through the air and carries it to the earth with it. In this way the immediate effect of rain is to purify an atmosphere loaded with malaria. Probably a good deal of the beneficial effect accompanying thunder storms and hurricanes in the tropics depends on the heavy falls of rain by which they are attended. Malarial disease is not so prevalent in the tropics during or after the rains as in temperate climates it is checked about midsummer, when heavy showers are frequent, and appears again in autumn. These results are partly attributable to the effect of rain in dissolving and precipitating the earth minerals and solutions, which being carried into the soil are either absorbed by the roots of plants along with the other gases and products of decay which form their food, or they are carried only the water into streams and rivers, or they remain in the soil. But again rains raise into the air along with the moisture by which they cling. The beneficial effect of running streams is probably due to their power of absorbing and carrying away malaria. I heard of Philadelphia states that he was informed by a person familiar with the malarious districts of the United States that the vicinity of the rapids of rivers in such localities is more
insalubrious than their neighborhoods where they flow
smoothly. If this be the case, it is explicable in the sup-
position that the water of the river containing mal-
aria dissolved in it, carried it into the air when itself
thrown up in the form of vapour in the rugged fact
 Its course. Of course, it is

Trees are well known to have the power of arresting
malaria. This is explained by some of supposing that
malaria has an attraction for trees. The leaves of trees
and plants are known to have the power of absorbing
water. This probably accounts for their arresting mal-
aria as it is borne about by moisture. Besides water
leaves absorb Carbonic acid and ammonia. We have
been that these are the gaseous products of the pro-
cess of respiration during which malaria is generated.
Possibly malaria if, in a strictly gaseous body, may
be absorbed also along with these gases, in company
with which it is formed, or along with the water by
which it is carried about, and so contribute to the
nuisance of plants. If this be the case the veg-
etable kingdom besides preserving the chemical bal-
ance of the atmosphere, in regard to the Respiration of Car-
bonic acid and oxygen, exercises the important
function of purifying it from this noxious principle,
which probably exists everywhere to a greater or less extent upon the earth's surface, and exercises a widespread influence upon the animal economy. Be this as it may, the preventative effect of a barrier of trees against malaria is well known. The late Dr. Joseph Park of Philadelphia, in his practical lectures on a case that fell under his observation, in which a family previously in good health was attacked with a violent and fatal fever, apparently in consequence having cut an avenue for the same to more extensive view through a wood which intervened between them and a large tract of marsh in the territory of Guiana where lofty amphibious trees abounded "it is wonderful," say of Laennec to see how near to leeward of this most pestiferous marshes the settlers will venture with impunity to place their habitations, provided they have this security. The town of New Amsterdam in Berbice is situated within short cannon shot to leeward of a most offensive swamp in the thick track of a strong trade wind that blows night and day and pollutes even the sleeping apartments of the inhabitants with the stench of the marshes; yet it being as keen though every one is well aware that it would be almost certain death for a European to sleep,
or even remain after nightfall, until the closing of the lofty trees that cover the marsh at so close a distance. All of us equally aware that bent down the trees would be a most dangerous operation in itself and would certainly be productive of pestilence. To this instance we have an illustration besides the protective influence of trees of the faith of the distinction I ventured to make before between the processes of infection and asepsis, in referring the generation of malaria to the latter cause and excluding the former. Here there was abundance of that affection and its products were conveyed into the town as plumes of their impregnation on the zone of smell and yet they did not generate malarial disease. In proof of this point, I will cite one or two more examples though not out of place because I omitted to do so before. The town of Point au Père in Guadaloupe is situated among the most jarring marshes on the world, the stench of which is never absent from the streets yet the place was far from being uniformly unhealthy. Strangers though much annoyed by the smell, often resorted to the place with impunity.

Dr. Jas Johnson mentions that in the month of May and beginning of June, at Calcutta, the heat is excessive
and each side of the river Poagley presents a broad alluvial slope of mud and mire, covered with vegetable remains in all stages of fermentation, and discharging the most abominable stench, yet no ill effects are produced by such exhalations."

Perhaps in some instances the putrid influence ghets of water or frets is in a greater or less measure mechanical. They may act in the same way as hills or rising ground, by diverting the stream to or elevating above them the column of malarial vapour as it is carried along by the wind, and so blotting causes with their immediate vicinity from its influence.

9. existing stagnant or impure water is said to preserve of endemic disease. This may be referred to its power of holding malaria in solution, which may thus be introduced into the system through the stomach instead of through the lungs as usually is. The Bombay Medical Board in a review of the paper of Mr. Brutton on this subject submitted to their consideration, in which he called the attention of the Indian Government to the propriety of causing wells to be dug and kept in an efficient state in the jungle districts of India, as a mode of prevention of disease. Producers of standing bad water, came to the following conclusions: "It is unquestionable
On the Influence of Tropical Climates on European Con-
stitutions. J. James Johnson, M.D. Linnæus Martinus Soc.
1841. P92
that decomposing organic matters in suspension or solution so found in the water of rivers, brooks or nullahs in great or small proportion.

2. It cannot be doubted that water strongly impregnated with this is detestable.

3. The Board could refer to recent instances in which such impure water produced serious disease in bodies of men (fever and bowel complaint) which was at once checked & water being procured from pure sources.

4. The natives in some districts attributed their fevers and enlarged spleen to the bad water of their district.

5. They cannot affirm that bad water is producing more disease than malaria (as Dr. Bellingham alleged) but recommend Dr. Bellingham's plan to the attention of Government and think it would be productive of benefit.

6. Poeticide being a necessary condition of the existence of malaria, and of great importance in regulating its distribution as we have seen, indirectly contributes to its formation & promoting the growth of wild vegetation whose decay and decay is the direct source of this material.
Edinburgh Medical Journal Dec 1836 A.B. 609 Indian Annals & Medical Review April 1836
c Heat.

Heat, by its influence in regulating the amount of the two conditions (1 & 2) is itself thus indirectly one of the most important, if not all the conditions of existence of malaria. Thus, its degree of intensity (1 & 2) and consequently the luxuriance of vegetation (1 & 2) and consequent the amount of organic results, the submitted decay. It is also an essential condition chemically of the process of decay or nemesis. Its variations at different parts of the earth's surface create currents of wind and these determine falls of rain. Rain affects the moisture in the soil which is necessary to vegetable growth and essential to its decay. Heat evaporates this moisture with its attendant malaria. A certain height of temperature is requisite to enable the air to suspend so much moisture as is necessary to the aerial existence of malaria or its suspension in sufficient quantity to be detectable. A certain temperature being thus more or less directly necessary to the generation, conveyance into, and through the air, of malaria, is fundamentally the most essential condition of its existence. It has been moreover ascertained that it must reach a certain point in order to produce malarial disease.
Miasmatic fever seldom occurs under a temperature of 60° F., though the other essential conditions already specified be present; at 80° F. they are very abundant and increase in intensity the nearer he approached the equator. A reduction below 60° F. check this eruption when previously in action. The occurrence of fever speedily arrests them. Mr. A. P. Johnston in the portion of his Physical Atlas devoted to Medical Geography thus describes the Geographical Distribution of Malaria:

"Thus the specifically malarial form of malarial disease is an endemic in all warm climates. It has its base within the Tropics and extends northwards till arrested by decreasing temperature. From its constant occurrence within the Tropics and ceasing far south of the Polar Circle it appears that a high temperature is necessary to its production. A summer temperature of 60° F. is necessary to its production and it will not prevail as an epidemic where the temperature is below 60° F. It therefore occurs in winter where the mean temperature of this season is 60° F. or upward as at Vera Cruz, Jamaica, Havana; but at New Orleans and generally under the 30th Parallel where the mean winter temperature is under 50° the fever is suspended. At New Orleans the necessary heat exists for nine
months of the year, from March to November at Havana for 5 months, May to Sept. and at Montreal 4 and Quebec 3 months. A continuance of more than two months at least at 60° is necessary to development, since it prevails more in October than in April though the mean temperature is nearly the same, and its greatest prevalence in every latitude is generally some weeks after the hottest months of the year. The decrease of autumnal fever with the decrease of temperature is strikingly exhibited in the Tables furnished at 26 military posts between the Gulf of Mexico and Lake Superior (Table vol I 1786) In latitude 24° 33' South at Key West, the total number of attacks was Intermittent 179, Remittent 11, Total of year 190, while at Fort Brady 46° 39' North, there were 9 Intermittent 11, Remittent 3, Total 14. At Savannah autumnal fever is epidemic from April to Oct., the rest of the year it is sporadic. Its type also changes in the southern provinces of South America according to the season from single tertian in the beginning of summer to double tertian in the hottest months and last year the single form as the weather gets cool. Nelson 1806.

Besides the Raigortat institution of malaria temporary and temperature its perpendicular is so also...
This is illustrated by the effect of elevation above the sea in exempting places from malarial fever in the same latitude as others that are affected by it, and in the variation according to latitude in the elevation above the sea at which it is prevalent, thus while it causes the "tierra caliente" of Mexico near the level of the sea, it is almost unknown in and around the city of Mexico 4,500 feet above that level, although both places are in the same latitude. The inhabitants of the Appalachian Mountains at an elevation of about 2,000 feet are almost exempt, while those who inhabit the valleys under the same parallels are affected further north at an elevation of 500 feet at the sources of the Alleghany and Genesee rivers, the disease is almost unknown, while on the low plains of the Ontario direct north it is prevalent. In lat. 41° it is prevalent at 900 feet above the level of the sea. It also prevails at 41° 30' at 1,100 feet in elevation all along the rivers and ponds of the Alleghany basin. It constantly increases in elevation of the desert of the heart of the Missionippi and the increasing height of the plains are probably the chief causes of the disappearance of the fever in the same parallels, in which it prevails on the banks of that river in Europe in lat. 52° at Basel.
It rises little more than 2000 feet above the sea. The Ague Jartic South it occurs every year at an elevation of 600 feet or 700 feet near Tenerife on the breezes, but at 900 feet it comes only once in 10 years in isolated cases. In Let 47° at Lake 1200 feet above the sea it is endemic. It is sometimes epidemic in Tang in Switzerland 1500 feet, and it is prevalent on the plain of Castile 2300 feet above the sea. In Peru Ague is observed at an elevation of 1800 or 12,000 feet above the sea and according to Schreiber it occurs there in dry and barren regions. In Let 42° both the topographical conditions which originate autumnal fever are nearly overcome at a mean altitude of 14,000 feet, but among the mountains of Virginia at an elevation of 1800 feet Prof. Rogers saw many cases of intermittent fever, which may be described as difference of latitude being 1° further South. In the temperate Zone malarial fever is confined to certain districts and never appears in mountainous spots in Asia on the other hand it exists in little elevations and is there known as Hill Fever. But as we ascend the higher it disappears at a certain elevation in the Himalayas.

The general conclusions the arrived at from the facts.
Physical Atlas: 1920
above justice are, that increasing elevation above the level of the sea is exerted far less correspondingly mimical the existence of malaria, and at a certain point fatal;
that this point varies according to latitude, being higher the nearer the equator, that is the latter the parallel. Now there can it will be no doubt that the great element in the production of these events is temperate which decreases in proportion to elevation above the sea, and is reduced the less altitude the further from the equator below the mean 9600 which has been shown to be the limit as regards temperature of the existence of malarial fever. Still it must not be overlooked that an increase of elevation is accompanied by a diminution of some of the conditions favourable, and an increase of others prejudicial to the existence of malaria. Thus the more elevated a locality, the less there expect to find in it such vast tracts of alluvial soil, as exist in the great basins of large rivers as they approach the sea, or such an extent of flat ground exposed alike to the action of vessel or to the atmosphere with moisture, to form the bed of marshes alone. Coaon, and the scanty and regulation and its clearance remains at another, regulation itself to the justice same ascent, in that
he found that the two conditions of the soil, decayed organic matter and moisture, which we have been the essential to the formation of malaria. On the other hand, he finds the atmosphere more agitated by winds and its presence diminished, and therefore the malaria generated more liable to diffuse and carried away in the air, and co-operate in its dissemination. The decrease of atmospheric pressure would doubtless have some effect, in decreasing the concentration of malaria, the following instance in proof of which I may quote here. Pauli observed that on one occasion at Flandre when the Barometer fell 18° in 24 hours, thirty-two individuals were seized with ague within four days. On the conjoint influence of heat and moisture and the distribution of disease, Sir Johnstone makes the following observations. "The Torrid Zone is characterized by the chief of diseases which include dysentery, yellow fever, malaria, and diseases of the liver."—All these diseases are more closely related to malaria as a cause. The immediate dependence on the chief of these cause, as important exciting cause, is shown by the circumstance that its maximum intensity corresponds with the country situated under the line of greatest annual mean temperature, the assumed
Signor of heat of the globe (82° F) which line also intersects
the line of greatest aqueous deposition (See fig 32 of this plate). From this line to about lat. 23° N, 53 per cent of the deaths
are attributable to these clap diseases while in lat. 35° N, the
heat by line of 77° F in July and on the boundary of the
next zone (Aridic-Steppe) the amount is only 14.4 cent,
and at the Cape of Good Hope 35° S, it is only 3.1 cent.
As paras can be ascended, the mortality from the
total clap in this zone is 75 per cent. In India this clap
of diseases causes 17 per 1000 deaths among the European
population and 3 per 1000 among the native population.
Sir John Bingle states clearly in the following words the
dependence of material fever on climatic conditions which
he observed during the campaigns in Holland & Belgium.
"According to the degree of heat and moisture of the season
the epidemic diseases begin earlier or later, are of
longer or shorter duration, and are attended with
milder or more alarming symptoms. It ought also to
be observed that the disease never begins till the
heat has continued long enough for the evaporation
and evaporation of the water! The epidemics of this
country (the Netherlands) may therefore be generally dates
from the end of July or beginning of August, their
terrible decline about the first falling of the leaf
and their end when the frosts begin. S maxlength ground
intense and continued heat even without rain occasion
the greatest moisture by the exhalation which they raise
and support in the atmosphere, whereas frequent showers
during the hot season cool the air, check the rise of the
vapours, abate and refresh the corrupted water and pre-
ceptate the putrid and noxious effluvia."
Diaries of the Army, page 3.
Certain geological formations have been observed to be more favourable to the development of malaria than others, or, at least, to concour with it more frequently. The Cretaceous and Tertiary have been noted to be particularly so, both in India and America. This no doubt depends, not entirely, at least in a great measure upon the physical configuration which its geological structure imparts upon a district, as regards regularity of surface, elevation, etc., or upon the character of the soil resulting from the disintegration of a particular soil as regards porosity, capability of retaining heat and moisture, and the nature of the vegetation to which it gives birth. Certain kinds of soil, after being saturated with moisture, when subjected to rapid desiccation, are more liable than others, in consequence of their physical character, to open into deep rents and fissures which allow the air to penetrate deep into the ground and the malaria formed under its influence to make its escape. At Kurnool on the Ganges, the soil consists of a wet, rich, and adhesive dark earth, of great depth, and which, when exposed, after the rains, to a powerful sun, exhales a very exquisit moisture, and opens into deep channels. Owing to this condition, Child, for accounting for the circumstance, disease was
most prevalent amongst the troops in this station and the mortality considerable. The banks of the river are clean and cleanly, and there are no marshes nor jungles nor woods of description calculated to account for the extent of the endemic diseases which were encountered in this place. This instance shows that it is not merely vegetable remains, under the influence of heat and moisture which are capable of engendering malaria but such remains under such conditions and in contact with the air, which is essential to the spread of malaria. We have already seen that vegetable matter may satisfy to be decomposed without the agency of oxygen but that in such cases it is not capable of producing malaria, or rather does not always produce it, from other cases the two processes of putrefaction and emanations may be associated.
Having now fully considered the true conditions which I have ranked as those essential to the existence of malaria, it may be as well to consider some certain objections to this doctrine.

I have already mentioned certain instances apparently exceptional to the condition of organic decay, and at the same time I mentioned the caution with which each case should be treated, in consequence of the insufficiency of the evidence in regard to many important points, such as the nature of the deeper parts of the soil, the topographical character of the country for some distance round, and the direction of winds, in order to determine the impossibility of malaria generated from organic decay at other parts, and its conveyance to the place where its effects were felt. I may also mention here another source of fallacy in these cases, namely the period of incubation of malaria, which I will afterwards consider more particularly. Persons may have infected malaria in one place and subsequently move thither where weeks or months after it takes effect, and the latter situation naturally gets the blame.

This fact (of malaria having a latent period) will soon to explain,
the fatal Siber Expedition of 1841, January 18th, 1841, but not until long after the swamp had been passed and a comparatively healthy region attained. It is also stated in opposition to these conditions that I have mentioned being regarded as essential, that they exist in an eminent degree in certain situations where the effects of malaria are not known.

New South Wales, extending from 103° to 38° latitude, embraces a region similarly situated to that of America from the West Indies to the Cape of Good Hope. This subject the rainy season; it has streams estuaries extensive swamps. Around some of its towns live a deep black, highly productive vegetable mould. Its table shows extraordinary inundations, which lay the country as far as the eye can reach under a sheet of muddy water. The temperature is as high as that of any other like latitude. The coast is covered by mangroves. Animal and vegetable products are those of the equatorial regions. But notwithstanding all these conditions, which usually denote a gelatinous region, New Holland is remarkable for its celebrity.

Mr. Allan, who accompanied Captain Bulloch on the exploring expedition to the Pacific Ocean, states that he never saw a case of ague either in natives or
Strangers in the американ Islands, though the officers and men employed here and slept in the midst of marsh exhalations and mosquitoes, when the days were hot and the huts were open and exposed.

Dr. Parke mentions it as a "remarkable fact," that although the Borovus of North America abound in Argosy, yet that disease is never seen among the inhabitants of the swamps and moist tracts of 170,000 acres on the Frontiers of Virginia and North Carolina, and not far from Annapolis on the banks of the Potomac. We learn from him that the immense tract is covered with trees and bushes, with water which appears at the moment the shallowest trench is dug. The water is brown, with a colored tinge; it is not quite clear and not palatable. The color is ascribed by the inhabitants to the roots of juniper and it is said to be diuretic. I have seen and other such instances which might be given to furnish the negative argument, that while heat, moisture, and organic remains are present in these situations, malaria is not generated at all, or the amount which might be expected if these were the only essential conditions. It may be that some of the conditions which we already know to be antagonistic to the development or action of malaria, or others which have not
Edit me this I seem Rail X:IIi Pi:ii
It has been ascertained that there have been for centuries with the essential conditions being met, and prevented the forma-
tion of the malaria which usually takes place under their influence, or its effect upon the system. In the instance
of the Irianal Swamp cito, illustrates this very well where the trees which are reported to cover the marsh may
maybe supposed to consume the malaria or ciremu-
like its diffusion, as in the instance of the marsh near
New Amsterdam in Berbice before quoted. The water which
statists state exists in such abundance, below the
surface, prinarily moves slowly along, and may have de-
solved the musk and carried it away. Among its other
remarkable properties claimed is doubt from the soil
through which it proceeds it may have that great
ability of preventing the formation of the fever poison.
A combination of such circumstances, with others that
we do not know of in the constitution of the soil or
air, may prevent the formation of the fever poison
under circumstances where all the favourable con-
ditions we have considered are present, but such
cases by no means prove that they are not essential
our knowledge of the nature and properties of the
Malar Poison are as yet far too limited to justify
me in coming to any such conclusion.
Conditions distinctive of or antagonistic to the influence of malaria.

a. The presence of growing vegetation especially trees, shrubs, and grasses is believed to attract certain insects that carry malaria, and it is suggested that this may partly be explained if it is supposed that their leaves and those of other plants in general absorb a part of their nourishment along with carbonic and nitric and ammonia, and that it is taken up by their roots. Assuming this to be correct, the decline of vegetable life in autumn in temperate climates and other corresponding periods in the tropics, by putting a stop to this consumption may cooperate with the decay of other remains in favouring the accumulation of malaria, or the other products of decay with which its formation is connected. In this view, plants which have a brief period of existence such as annuals, which grow rapidly and then die and decay do as much harm as good, but others such as forest trees which live for many years and form wood gas a comparatively imperishable nature must have a beneficial effect in the purification of the atmosphere on which they continue to live. Cultivated crops must also in the same way be beneficial, because they are new as good.
men and animals, and not allowed to stray on the ground
where they grow. Forests in temperate climates are ben-
eficial by moderating the temperature, protecting the
earth's surface from the rays of the sun and pre-
venting undue evaporation, and clearing them away
so that fallsomes & outbuilds of animates Jones. In
Tropical latitudes on the other hand, where the heat
in the shade is abundantly sufficient for the for-
nation of malaria, forests do harm in as far as they
promote moisture and afford shelter for the accum-
ulation of malarial.

Aquatic plants growing on the surface of stagnant
pools or water are supposed to have a beneficial ef-
fect in purifying it. If they have such a power it
probably depends partly on their consumption of malarial
or the seed in solution by the water. The calves in
India are said to be well aware of this provision quickly
and to observe great caution in drinking any fresh
water where such seeds or plants do not exist. The
green coating of fungous vegetation which often covers
the surface of shallow and stagnant pools, and deters
inlet vecetion serves probably as a preventative of
the case by appropriating as foes the miasma de-
clops on the soil beneath. It is therefore never advisa-
ble...
Sullivans Bungalow and the link.
visible to remove this scum; and it is not impossible that a violent rain may sometimes disperse it. As Cartwright indicates, a river or stream, under ordinary circumstances, has extraordinary antiscorbutic properties to preserve grandiflora, an aquatic plant growing abundantly in the stagnant waters of the northern sections of Louisiana. He found his relief in the facts that the waters which it frequents are perfectly sweet and pure, while those similarly situated on other respects, are foul, and that the whole country inhabited by it is comparatively exempt from scrofula, the disease, though marked by all the characters which are found elsewhere. The plant derives its sustenance not from the soil, but from the water and thus consumes all the soluble products of vegetable decomposition as fast as they are formed.

"Quatre plants (Cayp T. Balfour) appear to possess all the attributes of a plant possessing stomachic acid. In some cases in volcanic countries where Carbonic acid rises in great quantity through the water, negotiation is very vigorous and the separation of the gaseous gas on rapidly. - Poison of gaseous emanations may particular manner the composition of the water..."
Wood Practice of Medicine 1956

The patient will have a follow-up appointment next week. Please ensure all medications are taken as prescribed. If there are any concerns or questions, please do not hesitate to contact me.

The patient has been advised to maintain a healthy diet and to avoid any stressful activities. Regular exercise is recommended to improve overall health.

Please check the patient's chart for the latest medical records and ensure all necessary documentation is up to date.
oponds of Ceylon, and he finds that it varies according to the intensity of solar light, and the elevation of the sun. It commences at daybreak, increases slowly at first, then rapidly and reaches its maximum at four or five o'clock in the afternoon. The marshes in Ceylon produce a variety of plants, such as grasses, rushes, water lilies, cattails, and the intertices between these plants are covered with Poeta glutinosa, which floating on the surface of the water, decomposes noxious gases, and gives out respirable gas. Such plants not only give a supply of oxygen but also tend to purify the water and render it more fit for animal life. Cleve and Gratiot have the result of recent experiments that the decomposition of carbonic acid is performed with greater rapidity by submerged aquatic plants, and that they separate more oxygen in a given time than most other plants. These statements show that plants, especially aquatic plants, are emitters of more the power of containing aerial noxious gases in the water which they flow and to purifying it. May they not consume malice among the rest? I think it is probable they do so under the lip insalubrity of the marshes in
Alg. Backg Botany J. H. Balfour M.D. in Professor of Medecine and Botany in the University of Edinburgh 1832. 0 466.
which aquatic plants grow may in some measure be due to the circumstance that a certain depth of water is requisite to enable such plants to exist, and that this also prevents some have been the generation of malaria. Is that its absence may be, merely a coincidence or the result of their presence. Probably both circumstances essential in the covering water, and the consuming power of the plants growing in it prevent the accumulation of malaria in such localities. For there is no reason why the one explanation should exclude the other.

b. The presence of a town. Dr. Good remarks: “There is another extraordinary and very important fact in relation to miasmata which cannot be overlooked. These effluvia are neutralized, decomposed or in some other way rendered innocuous by the air of large cities. Though malarious diseases may rage around a city and even invade the outstations where the dwellings are comparatively few, yet they are unable to penetrate into the interior; and individuals who never leave their thickly built forts almost always escape. This fact is notorious in regard to the city of Rome and we have been abundantly confirmed in the larger towns in the United States in the neighborhood of which
These diseases have prevailed. If you does not include yellow fever among malarial diseases, the prospect of exclusion which I will consider afterwards. That it is in the air of the city which is thus incompatible with malaria is unknown, but very probably it is connected with the results of combustion. So the fire and smoke gramps are asserted to have the same effect, and have been assumed by persons inhabiting malarial districts as curing that they have been able to protect themselves against the feverous effects of malaria. Fires in their houses during the sickly season.

In the town,
11. Practice of Medicine Vol.
12. Diseases of the Army C4
While in all, the difference in point of health could be ascribed to nothing, but to the greater moisture of the buildings, being in other respects both tops were equal viz as to their altitude and exercise."

"The suburbs and walls of a city or town" say Sir James M'Nabby, "also serve to intercept this poison in its passage from its source, as is well known to physicians in Italy, and to those who have had sufficient experience in a warm climate. Even the buildings of one end of a narrow or crassate street have been known frequently to prove the means of exemption of those quits upon extremity from the effects of this substance, among other interests to which it here, whilst it is being conveyed by night winds from adjoining swamps or rice fields."

It is possible that in temperate climates where there is more fires kept up with coals, and the air is never so laden with miasma, or in such a moist state from the tropics, that the material-bearing stream coming in contact with the comparative dry air of the towns may be so deprived of its moisture, as to render it incapable of carrying malaria into them in such a concentrated state as before injurious. But we cannot hazard imagine that the amount of combustion
Incises of India P. 38
going on in the towns of the Indies, especially during the night, which is the time at which the air is most loaded with moisture and malaria most concentrated, would be sufficient to affect the whole air hanging over it. Such an extent of holding it in would make it inapplicable for containing malaria, or that poison in it. Still as malaria is so delicate and unappreciable a substance it may be affected by equally slight and unappreciable atmospheric conditions. If the results of combustion have any effect on malaria as yet to seem to show that they certainly have this may explain the alleged preventive effect of smoking cigars or the liquor in India having exposure to malaria.

It may be that the miasmatic poison is conveyed by the aspiration of the mass of inhabitants in the thickly populated parts of a town, and so the divide in such a way amongst them, that each individual inhales a portion but none inhales a sufficient quantity to be injuriously affected, while the air is purified by the combined efforts of the whole.
one, of diverting beach side or elevating above its
buildings the current gair flowing from a mi-
cromate source and thus protecting its inhabitants
in the same way as a hill or helping trees protect
the persons living within its shelter.
The above statements in regard to the preventive influence
of towns do not apply to Yellow Fever of which he regarded
as an inclined Christianity taught as a form of mal-
arial fever.

173 O Drainage and cultivation.
The beneficial effect of cultivation in improving the health
of districts especially as regards malarial Fever has been
abundantly forced. There are numerous examples got
in our own country. Before the swamp called the For
Lough, occupying the low ground between the oceans and
Towns of Edinburgh was drained, Inomittant Fever was
the not uncommon in the neighbourhood since its site
has been converted into gardens, railways etc the disease
has become quite extinct. "Finally" says Drane Kjel
has of rathor common occurrence in some nearly
district in the immediate vicinity of Dublin, and con-
sequent when saw a fatal case of Intermittent
Fever were constantly the met with in the hospitals.
now the low ground have been drained and this
The production of ague has been entirely arrested.

The following extracts from the reports of the periodical inspectors to the health of the various districts of Scotland, published in the statistical accounts, are to the same effect:

Kirkwall. "So much drowning that now the enzans; formerly agues common now quite unknown." Kimus. "Egues prevalent sixty years ago in consequence of marshes now never met with." Kessow. "Ague formerly frequent but not since the land was drained." Kirthg. "Ague was frequent formerly but not since the land was drained and planted."

In short, "Great improvement in agriculture, ague formerly prevalent not so now." Similar statements are made in regard to many parts of the country.

The mode in which drainage effects this beneficial result is very obvious. It causes to percolate through the soil and carry away in running streams the sludge which would otherwise tend to lie on the surface of the ground, and keep in a state of constant moisture, thus favouring decay and the formation of malaria; and, becoming charged with the mineral material, would be again raised up into the air by evaporation. Cultivation for himself sets fartly by removing forming the active growth of vegetation the
Voluntary influence which has already been asserted and removing it to some as fast for men and animals as soon as it comes, if left on the ground, begins to feed to decay, whose deleterious results are thus prevented.

A elevation above the level of the sea.

The effect of elevation in protecting according to the sea from one another has already been fully considered.

C. Ferruginous impregnation of the soil.

Therefore there is Ferruginous that is iron clay, endemic disease is unknown. With the ferruginous impregnation the production of endemic or tetrachloric disease seems to be incompatible. The soil of Egypt is composed with the flat part of ferruginous clay. The island has the character of being very healthy. Though it contains all the elements of malarial generation to a high degree.

He shall see hereafter that chronic malarial disease has a remarkable tendency to induce anaemia, which is cured by the administration of iron. Has this fact any connection with that just mentioned? They ought both be explained on the hypothesis that malaria has an affinity for iron which causes it to adhere in a ferruginous soil, and to seize upon and appropriate that element of the calcar-


ing matter of the blood

3. Of Phthisies Pulmonalis. An opinion has long been
maintained and discussed, that this disease and
malarial fever are incompatible.

Dr. Harrison of Honesett in Lincolnshire, read a paper
before the Medical Society of that town in 1832 main-
taining this doctrine. At Wells on the 25th Dec. 1841 he
read a paper before the Royal Chirurgical Society of London,
entitled: Observations on Pulmonary Consumption and
Intermittent Fever chief as disease opposed to all others
concurrent with the sickness. In 1844 Dr. Henry Robert Southey
published an Essay on Pulmonary Consumption, in
which he disserted from it. In an Essay on the Female
A. Regiene for 1845, Dr. Roudin maintains the antagonism
of febrile fevers not only with Pulmonary consumption
but with typhus and typhoid fevers. In 1840 A. S. Eun
communicates to the New York Journal of Medicine and
Surgery some observations on the influence of malarious
atmosphere in the prevention and cure of Phthisis
Pulmonalis. He relates cases which came under his own
observation, in which persons, labouring under self
inflicted Phthisis Pulmonalis recovered apparently, without
sequence getting up their residence in malarious
districts. Dr. Helft of Berlin in an Essay published on
1846, combats the idea of malaria having any intrinsic
in power against Pthysia [1]
It is not proposed further into the question, I believe
that malaria and Pthysia have truly no antagonism,
and that the truth, which lies at the bottom of the
 Doctrine that they have is, that the climate conditions
under which the two diseases are most prevalent do not coexist. Pthysia is most prevalent in
temperate and cold climates, malarial fever in the
tropics. The warm, still, and moist atmosphere which
favours the accumulation of malaria is least irrit-
ting to the pulmonary organs, and so far as this
was to be beneficial the Pthysial patient
by enabling him to take exercise in the open air
has first element of the tonic regimen by which and
enrichment. Pthysia can alone be benefitted with
present state your knowledge. Again, on the con-
trary, the cold variable climates which favour
pulmonary disease, do not afford the conditions fa-
orable to a great development of malaria.
Of the natives of tropic climates, especially the black
races are less subject to malarial disease than to
Pthysia; it is because their ancestors have breathed
from time immemorial setting themselves from infancy
Zeitschrift für gesammte Medizin B. 3. S. 360
the poison which produces the former, so that they are by descent and individual habit made proof against its influence, whereas Phthisis being a constitutional disease not dependent on any special external source but on a vice of the system they can never become exempt from it, so long as frail specimens of humanity continue to exist among them. If the converse holds good in regard to visitors of the Tropics who are natives of temperate climates it is for opposite reasons.

The distance to which Malaria may be conveyed from the places where it originates, in such a concentrated form as still to be capable of producing disease, depends entirely on the amount of perfection of the favourable conditions already specified, and the degree of absence of the opposing circumstances mentioned. If, for example, abundant materials for its generation in the soil, a hot, moist atmosphere, with a gentle steady current, air in one direction, with the conducting effect of a valley extending towards the same point, and the absence of wind, sheets of water, or intercepting elevations, will enable a column of malaria-bearing vapour to travel a long way, without long affinity nor diluted by the surrounding healthy
medium, so that the resonant material which it con-
veys may be in such a concentrated state as to take
effect upon the system at that distance. An exactly
opposite state of matter will prevent the beam
from being carried any distance in such a state as
to cause injuries. Between these two extremes
there are numerous variations of external circum-
stances, according to which the conveyance of the
beam will be regulated, in conformity with its laws and
properties already specified. Here it wants be useful
to attempt to describe, they can only be ascertained by
careful observation upon the spot.

Dr. Cullock states that malaria may take effect five
or six miles from its source.

5. Theories as to the nature of malaria.

Having discussed the conditions under which this
substance is generated, mention should be paid to the
properties known, and the conditions which are
imposed that this may be the proper place to allude
to its probable intimate nature. In the present
state your knowledge we can only speculate as to whether it be a simply gaseous body or
whether it be composed of microscopic organisms,
animal or vegetable suspended in the air, and
even on this general point we are quite at a loss to determine.

Dr. Mitchell of Philadelphia has vigorously supported the opinion that malarial disease is due to the attacks of microscopic fungi. The principal arguments in support of this view are the following: fungi are developed in all decaying animal and vegetable matter, or decaying organic matter in contact with moisture. The most unhealthy season of all regions corresponds with the decline of phanerogamous vegetation, when it becomes the meadow of the cryptogamous which is now developed upon the decaying remains of the former. If its species of fungi enumerated by Dr. Rossiter early grow at all seasons, 1 at the end of summer & exclusive in summer 28 in summer and autumn and 62 exclusive in autumn. The growth of fungi thus corresponds with the frequency of malarial disease in the various seasons, in the order of winter spring summer autumn. Fungi spring up and are developed with remarkable rapidity during the night; this is the period at which microscopical disease is most liable to contract. Fungi have been observed the very abundant during the prevalence of epidemics. Countries remarkable for endemic disease are also noted for the production of fungi. As
Malarial fever becomes epidemic in certain seasons as the growth of fungi is marked by periods of great leaf abundance. The symptoms produced by poisoning with fungi somewhat resemble those of malaria. Several diseases of the cutaneous and mucous surfaces in man have for long years been traced to the development of certain fungi. Both animals and plants are subject to the attacks of innumerable specific forms of fungi.

Admitting all these statements to be correct, the development of fungi concomitant with malaria may be mere coincidence, both being independently dependent upon the same conditions of organic decay, heat, and moisture. Still on the whole perhaps this is the most plausible hypothesis on the subject. Malaria may be due to an unknown gas, since none as yet known can be detected in the air which contains it adequate to produce its effects. It may be the one gaseous yet undiscovered microscopic animalcule, for we know that the one gaseous yet lower forms of the animal world are carried about like the spores of the lower forms of the vegetable kingdom, by air and water. It matters not much which of these hypotheses we...
On the Cryptogamous Origin of Malarious Epidemics.

adopt in the present state your knowledge on the subject. This sufficient that we call the vitriolic agent whatever be its nature by a given name, malaria, and that we know the condition, whatever it shall afterwards prove to be, under which it is produced, the person to which it exhibits itself, and the symptoms which it produces on the human body. It is equally not more probable than any other above hypotheses, that malaria is not any special constancy atoms of decaying organic matter carried up into the air of the agency of moisture while still undergoing the process germa-causis.
2. Precipitating Cause of Malarial Fever

These apply the term precipitating causes to those circumstances which give rise to certain conditions of the system, during which the malarial poison introduced into it by pulmonary absorption or other channels, is capable of producing its peculiar toxicological effects upon it. Since the term is not commonly employed and understood as it seems it is a strictly correct one, there is reason to doubt whether the malarial or any other of the poisons which when received into the blood, give rise to the symptoms of any of the diseases denominated in accordance with the fermentation theory, symptoms are capable of producing their characteristic phenomena in a perfect, healthy state of the circulatory fluid. If it were so, it would follow that persons who are exposed to an atmosphere charged with malaria or any other fever poison, and who must therefore each breathe a certain quantity of the malarial agent, would all be more or less affected by it, and each individual would exhibit symptoms exactly proportional in severity to the quantity he has received into his blood. But we know that such is not the case, that on the contrary, the persons exposed...
A material air, some show no marked symptoms at all, and those who do do not always exhibit them with a severity directly proportional to the degree of exposure; he cannot suppose that different quantities of the poison, or none at all, enter the brains of persons similarly exposed to it, for the introduction of it into the system must depend upon the quantity which is inhaled; this is dependent upon the power and activity of the mechanism of respiration which does not differ very widely in different individuals. It appears therefore that a certain state of the system (in this vague term for the present) is almost as essential to the development of the phenomenon of material and after poisons as the introduction into it of the specific nature of the poison. This condition of the system constitutes the so-called predisposing state or predisposition in each particular case and the circumstances which induce it are the predisposing causes. The importance of these circumstances is consequently not sufficiently strongly expressed if the term predisposing be used; they are equally essential, directly or indirectly, as the direct or immediate agent, the particular poison. If the particular state of the system which constitutes the predisposition reach
ticular dynamic tissue, it would become the source to an equal extent, as an essential cause or condition of the disease, as the specific poison, since both are required to operate in order to produce the phenomena of the fever, and either of them might persist alone in the blood without giving rise to these phenomena till the other was superseded.

It is not at all certain that the predisposing state of the system, is prior or post to time in all cases to the introduction into it of the external modifying agent. Probably in many cases the specific poison has been inhaled and is circulating in the blood, but would in course of time be eliminated without producing any marked phenomena, were it not that before it is all put aside, the particular state of the blood is reached which enables it to take effect in consequence of exposure to some as-called predisposing cause. In truth in these cases, the specific poison is the predisposing cause, and the state of the system usually called the predisposition is the immediate cause of the disease. Usually it is a degree of development of those states of the blood or system, newly called predispositions, and in the period of their occurrence as whether before or after the introduction of the specific
mobific agent, and in the constancies of their induction probably explain many of the otherwise unaccountable variations in the phenomena of those epidemic diseases, as regard their intensity in different individuals, the gradual or sudden manner of their occurrence, and nature of their termination.

If these views be correct, the importance on a medical point of view of arriving at a knowledge, as to what conditions of the system exactly are, cannot be overstated, since we are more likely to treat upon these symptoms of malaria or other fevers, and in whatever cases we can exceed in danger, we should render the latter more, which would be equivalent to destroying it or preventing its formation. Unfortunately, however, these conditions are very obscure, we have as yet devised no means of investigating the constitution of the circulatory fluid and solid tissues of the human body as they exist during life, or ascertaining the occurrence and changes in them as predispose to the diseases in question. These conditions occur apparently either in a state of health, and are not marked by any obvious moral symptoms. Experience however has enabled
Physicians fix upon certain circumstances, act. they have observed that upon the constitution of individuals, which are more or less instrumental in inducing those conditions of the body, which circumstances they have named Predisposing Causes, and there is now proc- ess to consider. Predisposing Causes of disease are in general the same as the general manner, as those which induce debility, depression of the vital powers. Arrangements of the bodily functions, which conditions render the body more easily affected by mor-


die influences, if able to resist their effects, and more particularly if able to terminate with sufficient capacity any noxious material which may enter the blood, which consequently accumulates in it. In con-


sequence of the diminished energy of the executive func-
tions. There is no doubt a general truth conveyed in this arrangement, for no one doubts that debili-
tating Causes predispose to disease, but still any explanation which it gives of the difference bly late affects of disease and other allied phenomenons is very vague and unsatisfactory, and leaves many things unaccounted for.

Dr. Carpenter has endeavoured to point out more pre-
cisely the manner in which the usually designated
Predispousing causes of disease act, and in a more philosophical manner in which they may be arranged he states that "they all tend to produce in the flesh an undue accumulation of agotic matter already in a state of unstable metamorphosis and therefore, being in the condition in which it is most readily acted upon by ferment, that the presence of such matter is absolutely requisite in the vast majority of cases for the morbid action of the by-motive poison, which has no direct action upon healthy blood, all whose components are in a state of progressive metamorphosis, and that the liability of sick individuals among a number who may be concurrently exposed to the same poison will mainly depend upon the degree in which their blood may be charged with the matters in question."

In enumerating the predisposing causes of disease I shall follow the arrangement proposed by Tartarini founded upon the above proposition, for although it may be very theoretical, it is very consistent and convenient, and the facts, under whatever arrangement introduced, are not in the least invalid.
On the Rediscovering Cancer of Epidemics. British and For
med. chir. Revew  January 1833
A. Those which tend to introduce into the system decomposing matter that has been generated in some external source.

1. Contaminated air.

The evils of breathing an atmosphere laden with animal effluvia exhalations in inducing fever in general is well known. It does not act so much in the case of malarial fever, except in exceptional instances in which this fever becomes epidemic in towns as yellow fever, which because it resides more in the country, where such exhalations are not given so abundantly, have been seen that decomposing organic, chiefly vegetable, matter either affects the materials out of which, or the vehicles in which malaria is developed, itself entering the blood in a state of decay constitutes the poison. This decomposing organic matter being carried up into an hallucinating the air may act, if he not only the direct cause, as a predisposing cause of malarial fever by introducing into the blood material upon which the fever poison may act.

2. Impure water. The same remarks apply to this as to impure air. It may either either be the means of introducing the malarial poison itself into the system
or it may be the vehicle through which decomposing organic matter may enter it.

4. Antiseptic Good. It is not improbable that this also may be a predisposing cause of ovarian fevers, especially in those cases which are complicated with diarrhea and dysentery.

5. Those which cause an increased production of decomposing matter in the system itself.

A. Toxemia. The toxic and muscular excretion the excreta fatigue consequent upon unusual bodily exertion has always been found to be a strong predisposing cause of diseases in general, and of malarial fever as much as any. Its potency is usually referred to its effect in exhausting the energy of the Nervous System, and consequent debilitating the various bodily functions. But it also produces an accumulation of waste matter in the blood. From Physiology that the waste of the muscular and other organs is in proportion to the degree to which they are called into action, and that a corresponding amount of this enters the blood and requires to be removed by the various excretory organs. It is probable that both these effects of exertion come in conformity upon it its predisposing power.
The mensural liability of troops to malarial disease among other diseases especially in tropical climates, after long marches and hard fighting need only be alluded to. The fact is so well known as not to require illustration.

Scarcity mental labour

Scarcity mental labour, in activity or from anxiety, probably operates in the two-fold manner that does bodily exertion, but more in debilitated the nervous energy, while the latter produces more want of the blood. The mental anxiety and depression of spirits consequent upon reverses of fortune in the field, are well known to have an injurious effect upon the health of armies by predisposing them to attacks of disease. To dwell under such circumstances much bodily labour and great fatigues have the contrary, but must independently of these the state of the mind likewise. Hence a great effect in predisposing to or heightening disease. It has also been observed that persons who are in great and constant fear of being affected by any disease, among an epidemic are more generally affected than those whose minds are not the subjects of any such anxiety.

"Of all the influence's lay, the anxiety which acts upon the system as predisposing it to the injurious
Impotence of the external agents of fever, those that are more surely than those that affect in itself, operate internally, and affect the passions and affections of the mind. Of these fever, especially fever, depending grief, and anxiety of mind, vexation, disappointment, or whatever tuss, to whom the mental and vital energies, are among the most remarkable.

6. Those which the elimination of accompanying matter, normally or abnormally, generate within the system, or abnormally introduced into it from without.
   a. A high temperature. A high temperature has already been alluded to as one of the conditions of existence of the malarial poison.

   In the case of persons living in a tropical climate, the production of the same amount of animal heat as takes place in the temperate regions is not required and would probably be injurious. In order to accomplish a diminution of the animal heat there fore there must be a diminution of the tissues, which is the chemical power, which gives rise to animal heat. This diminution of the oxidation of the tissues is accomplished by a beautiful adaptation of the animal heating power in proportion to the atmosphere in accordance with the change.
which takes place in its density, in accordance with the temperature of the climate. Thus, an elevated temperature increases the volume of a given amount of air, and by so doing diminishes the dissipation of oxygen in a given volume. Consequently, the oxidizing power of the air relatively to its volume being diminished, the same degree of activity in the mechanical-vital part of the respiratory process would be followed by less of the chemico-vital transformation of the tissues. Therefore, such an amount of effete matter as would be normally thrown off in cold climates would tend to accumulate in the blood in the tissues. But in addition, the protecting effect of excessive heat on the tissues of a temperate climate greatly diminishes their inclination and ability to take active exercise, and thus the mechanical-vital part of the respiratory process is diminished also, and this entails a proportionate reduction of the chemico-vital part of the function, the activity of which is already relatively impaired. The processes of oxidation and decarbonisation of the blood and tissues, necessary to maintain their relative healthy constitution, being dependent on the thus comparatively sluggish pulmonary
function, are not so rapidly carried on as in cold climates, and there is less waste of the tissues and consequently less separation material required to be added to the blood. Along however as this nutritive material is added to the blood in proper proportion to the quantity of feeder matter of the tissues which is removed by excretion, the proper balance is maintained. But the European acculturated in hot climates too often hastily differs with his body, the tendency of nature to follow out this indication by stimulating his diminished appetite of all manner of savoury dishes, containing animal food loaded with fat, carbohydrates, alcoholic fluids. The blood in consequence becomes overcharged with carbonaceous matter which the tissues can neither make use of nor the lungs get rid of. For the reason alone let forth with insufficient expiration, one of the undeniable ultimate results of this encharged state of the blood with effete or superabundant matter, though not directly connecte with the present subject, is disease of the liver, which being called into constantly increased functional activity to assist in the removal of these matters the exertion of which should devolve upon the respiratory group.
but which it fails to accomplish, becomes infected and liable to inflammation and change of structure. However it by no means follows that where there is the just relation between food supply and exertion which is implied in the habits of any individual person in a warm climate, there obtains more operation of the burning vicarious of the lung in one climate than in another. The evidence that the bilious secretion is not increased rests on the fact, that in the natives of India and in Europeans whose habits of living have become adapted to the climate, arrangement of this kind is very rarely observed. However the "just relation" is very often not observed, as we shall see and consequently besides the disease of the liver remotely such a state of the blood loaded with excess of superabundant organic matter must of the theory have adopted the correct, predispose to melancholy humor, among others symptomatic disease, more directly. The reduction of the functional power of the digesting process must increase the importance of the predisposing cause, already therapeutically specified, by attenuating the elimination from the blood of the exhalent matter so formed or retained. The frustrating effect of excessive heat on the nervous system of Europeans in hot climates...
Incredible Dreams of India P.S. Dole
is superseded as a predisposing cause. The injurious effect of exposure to the sun during a long march or other great exertion is well known to the Army Surgeon in India, by the consequent amount and fatality of disease especially fevers.

6. Deficient ventilation, or overcrowding in houses, bars, &c.

The deficiency of supply, air thus induced, acts precisely in the same way in diminishing pulmonary secretion that heat has been explained to do, and the results are the same as far as that goes; but in addition to this deficient ventilation and overcrowding comes an accumulation of the organic and inorganic products of respiration and cutaneous exhalation, which must be winded into the blood and to increase its efforts and matter. Byers at Montpelly, ascertained by experiment that the fluid exhaled from the lungs contained 8 parts per 1000 of organic matter, and if kept in a closed vessel at an elevated temperature becomes putrid. This fortuitous the experiments of Mr. R. A. Smith show to depend on the decay of an albuminoid substance. (Phil. Mag. vol 30 0478)

Dr. Mackinnon states that in the month of May 1847 the 84th Regt stationed at Singapore in India
and quarters in two ranges of buildings extremely hot confined and ill ventilated less 60 men whilst there was not one death among the artillery living within a few yards but in better barracks. The great unhealthiness of Secunderabad in India as a station the mortality of which among European troops of the line is nearly double that of the average of the entire presidency of Madras is probably due to the same cause since the frequent representations of medical officers have shown that the accommodation of the barracks is insufficient for the men who are always crowded so much so that one third have been obliged to sleep in the verandahs while the rest had by no means a sufficient amount of air. The artillery who are stationed at no great distance in move living barracks never participated in this unusual mortality. The mortality of the British Troops in Hong Kong in 1842 was 19 3/4 per cent in 1843 2 3/8 per cent in 1844 13 1/4  per cent. During these years their accommodation was unsatisfactory in 1845 the accommodation being greatly improved the mortality fell to 8 1/2 per cent and since that time the troops having been lodged in what may be termed from their excellence model barracks their mortality at once dropped down to 3 1/2 per cent. 11
Intemperance in drinking

This affects directly what heat and deficient ventilation affect negatively, viz. loading the blood with effete matter by appropriating to itself the oxygen, whose duty it ought to be to prepare the tissues of the body for exertion, as well as directly loading it with carbon when the supply of oxygen becomes deficient. It also acts also by its depressant effect on the nervous system, consequent to its excitement. It has power as a predisposing cause of disease in as well known that it does not require to dwell upon. I will cite just one example. The 63rd Regt, which has not been remarkable for sobriety, lost 73 men during a nine months campaign at Secunderabad, at the rate of 19.2 p. 1000 for the whole year; the mortality of all the other stations in the Indian army being at the rate of 30.2 p. 1000. But when this Regiment was replaced at Secunderabad by the 84th, a large proportion of which were total abstainers, whilst nearly the whole remainder were absolutely temperate, the mortality of the station was reduced to 34.2 p. 1000, which for it was unprecedentedly low.

Here a strong conviction says Col. Rogers that the much of European disease in India is due to overstimulation.
And that the mortality among the European troops will not be lessened till the soldier is improved in his habits, until he is made to understand that temperance is for the benefit of his body, libraries for the benefit of his mind, good exercise for the benefit of his health, and saving banks for the benefit of his purse. Col. Rogers strongly recommends abstinence from the use of alcoholic liquors, and if they must be supplied to the soldier, the substitution of beer for distilled spirits. He conceives the utility of the former article, and of the change of liquor recommended, proved by the following statistics of the mortality of the armies of the three presidencies of India for the last 20 years exclusive of that from Cholera at Bombay.

<table>
<thead>
<tr>
<th>Army</th>
<th>Bengal</th>
<th>Bombay</th>
<th>Madras</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native troops</td>
<td>1.79</td>
<td>1.291</td>
<td>2.496</td>
</tr>
<tr>
<td>European troops</td>
<td>7.38</td>
<td>5.078</td>
<td>3.846</td>
</tr>
</tbody>
</table>

Three questions suggest themselves to our attention in considering this remarkable table. 1. How the great difference of mortality among the native and European troops coming together and exposed to the same causes of disease? There are at least two causes. The greater power of endurance with impunity of the Climatal
causes of disease, of the native races than of Europeans either from hereditary or congenital constitution, from aqueous humor pressure. In long exposure to the same cause, in consequence of the more predisposed individuals being cut off before puberty. This is no doubt the cause to which most weight must be attached. To the different mode of life. This is also a most important cause, secondarily that last mentioned. This is easily understood by comparing the mode of eating and drinking of the European soldier with the manner in which the native Hindoo who forms the majority of the population lives.

2. Where the difference in mortality among the European soldiers in the different presidencies lying in Madras about 3/4 the that of Bombay and little more than 1/2 more than that of Bengal. Climatic variations are not sufficient to explain it. The reason is that it is indicated by C. L. Lyles. The Bengal Army has no ports, but is furnished with ruin. A spirit not so wholesome as arrack. The Madras Army consumes a large quantity of gin, and comparatively little spirit, while of the latter only drink is arrack. The Bombay troops have only recently commenced the use of gin, and the spirit they drink is understood to be more wholesome than rum.
and as their Israel.

3. Whence the greater mortality among the native troops in Madras than in Bombay and Bengal. It is explained in a striking manner by difference in the religion and caste of the men, and by their consequent dissimilarity in mode of living. Of the Bombay army, says Col. Forbes, 1/8th consist of Hindoos and considerably more than 1/2 of the whole army are Hindostanees. These men never taste fish, meat or spirits, but live almost exclusively upon unleavened cakes, gur, lentils, and atta curds. The great majority of the Bengal army consists of a similar class of men. The Madras army in its constitution is the reverse of the other two. In the Cavalry there are from 6 to 7 Mussulmans for one Hindoo, and in the Infantry there is one Mussulman for every 1/2 or 1/4 Hindoo, and amongst the Hindoos there are a considerable number from castes without prejudices about food. Therefore the majority of the native troops of the Madras Army eat and drink like Europeans.

"If this appears that in the Madras Army where the habits of the natives are Europeans most closely assimilated, the mortality of the latter is less than
Double that of the former, whereas the mortality of the Bengal Europeans is nearly six times that of the Bombay natives; the difference being such a relation to the greater abstinence of the native soldiers and the larger consumption of spirits by the Europeans that it is scarcely possible to avoid the inference that they must be connected with the relation of cause and effect.”

The destructive effects of intemperance and predisposing cause,” remarks Dr. James Johnson, “are equally conspicuous and is tonight peculiar in Tropical Climate; for the injuries it occasions in Europe great as they are near no proportion to those which we witness in the East and West Inde.

A. Intemperance in eating. This though not generally recognized must of our thoughts correct be an important predisposing cause of malarial fever among other diseases. That its causes, diseases of the fever in hot climates is now universally acknowledged. It acts in exactly the same way as it predisposes to fever just as heat deficient ventilation and alcohol intemperance do. It was observed before before to Typhus fever in the Epidemic of the disease in Belgium in 1747 as this states of 55 cases “Another mistake also made was a sudden change from a deficient unknown one...
diet too full supply of nutritious food, which the paupers were subjected to on their admission into the workhouses. Any general change from habitual and healthy diet even to betterproves unwholesome and renders the human frame susceptible to disease. In 1851, during the epidemic, they were obliged to form an encampment for the troops, as the recruits who joined were famished sufferers, and fell into bad health from the change of diet. From a somewhat similar cause some years ago, one great regiment in Sweden, consisting of Valdecanians but nearly half its men, having been ordered to the capital from their own district, the sudden change of diet from their accustomed black bread and peas, butter and more nutritious food of Stockholm, so completely undermined their health that because the few who escaped disease were usual food was again victims to them.

I show that intemperance in eating, y'ille a much prompting cause of fever, must be a very common one in the tropics. Justtote following account of the marling of European officers in India by Dr. James Anderson which Dr. James Johnson also declares the "a faithful thing" not of the Military only but he believes equally of the Civil servants of the Company."
Officer goes to parade at 6 o'clock a.m., and breakfast between 6 and 9 on tea, coffee or cocoa, with fish, meat, eggs, rice, and whatever may be most applicable. From breakfast till 12 o'clock he generally applies to study or announcement of paying visits. Rehearses the lecture and perhaps a lecture breakfast, and the nature of the articles taken at it; it follows that which renders the necessity of gratifying it urgent, and occasional thoughts of wine and water, beer and water, or handy and water are therefore necessary. At one o'clock he eats a hearty dinner-lunch, consisting of roast and boiled meat, fish, mulligatawny or other soups, various wines, bottled beer. He afterwards occasionally takes a ride out on the bare, on a top or on his own, with cricket or fives, the evening parable. Dinner is next served at 7 o'clock or 7:30 p.m. This meal is generally pot-roast, consists of soups, fish, rice, and hot curries, roast and boiled meats and other richly made dishes, with various wines and bottled beer. To all this succeeds coffee or tea; and upon the emptied stomach and empty systems the officer goes to bed at 11 p.m., when the general
Collapse induces the second sleep, indicating falling to the lower plumes, attentant upon forlongs or stents. The condition of apnea is induced by its depressor effect upon the nervous system, indicative especially by dejection of spirits.

1. Insufficient exercise. This chiefly occurs as a cause glacies on warm climates and the mode in which it acts especially on diminishing the activity of the respiratory function has already been alluded to. It coagulates powerfully with heat and intemperance in eating and drinking in inducing a febrile state of the blood.

2. Other predisposing causes of disease not included in any of the above categories (A.D. 21)

a. Change of residence from a cold temperate but hot tropical climate. This is one of the most powerful
predisposing causes of material fever. Its mode of action is rather complex, as it embraces causal
factors causes already enumerated. To it apply the remarks already made under the heads of heat, and its
temperature in eating and drinking (C.A.D.), to which as predisposing causes of disease act preem-
minently on strangers on their arrival in the tropics.
Business of India P123.
and for some time after. The former habit, Quebec, and drinking which they had acquired in colder climates might have been very well suited to them but not so easily thrown off and modified to the new climate as might be supposed. Besides the whole system acquires time and it were to get broken in to accommodate itself to the change in the external conditions of its existence. His rapid metamorphosis, of tissue, which it has been accustomed, in a more oxygenating atmosphere, the lower temperature which permitted and acquired a greater generation of animal heat, and in which accordingly, in the language of Liebig, fuel was abundantly added to the furnace in the shape of food, and its prime got its growth proportionate rapidly by the lungs, cannot apparently be suddenly reduced to the proper standard of the new climate. It is probable that the full-blooded vigorous nature of a Temperate Latitude, could not bear a rapid reduction in the amount of nourishment to which he has long been accustomed when suddenly transferred to a Tropical Climate, to the abetments favoring the His most delectable African negros, without great detriment to the system and preservation of the vital powers, which
would be almost as great an evil as that which such a change of climate would be intended to alleviate. Such a change in the mode of life as is well known in tropical climates, therefore, probably requires a certain time for its accomplishment. One has already seen in the instances quoted from France and Russia, that an analogous alteration in the quantity and quality of food alone without change of climate, in the opposite direction from worse to better, is capable of producing very injurious effects upon the constitution.

I will refer to this subject again when speaking of acclimatization and epidemics of Malarial Fever in Youth. The condition of body during the period of growth, before arrival at puberty seems strongly predisposed to the influence of malarics, especially in the case of the children of those who are not natives of a Tropical Climate, so much so that in some countries the offspring of the white inhabitants can scarcely be brought to maturity without removal to more temperate or less malarious regions.

Again in the case of persons, emigrating soon after puberty to tropical from temperate latitudes, the first few years of their life are apt to be most fatal to them as in the case of recruits for instance joining
ments in the heat, and because youth within is a predisposing cause, but from the coincidence of these being rare exposed for the first time to malaria in a concentrated form, aided by the predisposing causes already mentioned. After a few years the mortality among these diminishes, because some have already been cut off by disease, and the others have to a greater or less degree overcome those predisposing causes which operate most powerfully at first.

Trotter in his "Clinical Illustrations of the Diseases of India" gives a table showing the respective ages of 3,500 Europeans who suffered from fever after their arrival at Camptee, among 119 who were exempt during three years residence there. "The most conspicuous result of this inquiry is," he states, "the greater immunity of persons at and beyond the age of twenty-five.

Out of 193 persons who in 1836 were under the age of 25, 106 were affected in the first year of their stay at Camptee, and only 58 escaped altogether, while of 276 individuals at and beyond the age of twenty-five 99 only were affected in their first season at this station, and 21 had no fever previous to the period of the author leaving the Regiment." P. 105. 106. 107.
6. All causes of debility, or debasement of the vital power, many of these have already been enumerated. It remains only to notice one or two others. Of these abolition is the most important. To power has been abundantly exemplified in the prevalence of epidemic diseases, especially those after seasons in which crops have failed and the inhabitants of certain districts have been exposed to unusual privations; or when armies have suffered from want of food. I need not adduce examples. The condition of sleep has already been alluded to, an agreeable mental despondency, anxiety, fear, grief.

(A) Epidemic Influence.

This is one of those convenient terms, which ease as a cloak for our ignorance, and which when analyzed are found to convey no meaning except a vague and mystical enunciation of the fact, which they have been invented by way of explaining. For example a malarial fever, usually endemic, that is confined to certain known localities, for some reason becomes epidemic, that is, it spreads beyond its ordinary limits and attacks generally in a more virulent form large masses of the people. Sometimes upon careful investigation, probably in most cases, too in a clearer extent and prevalence of the disease, can
he distinctly traces something unusual in the character of the season or in the condition of the people. It was a combination of these and other causes, and then of course the enquirer is satisfied. But if he is baffled in the attempt to trace any such causes, he is unwilling to remain conscious of his ignorance, and to admit that all he knows is, that the disease was more prevalent during a certain period and that he cannot tell why, which would be simply a statement of the truth, he conceals himself by manufacturing a term, whereby to express the same thing in a mystical manner, which he at the same time endeavors to flatter himself is some kind of explanation, because it implies that the increased mortality must be due to something in the air. He is truly the origin and meaning of the term epidemic influence. So long as this is a general truth conveyed in the idea, that some state of the air, or certain conditions connected with the atmosphere are the cause of the increased prevalence certain diseases at certain times, but it would be much better to express it in common language than by a special term, which is apt to mislead...
of its appearance of definition and react;nap. Why might this use the term "malarial" which escapes an invisible, indeterminate, atmospheric agency or condition equally unappreciable except by its effects? Because, however, though we have not discovered its exact nature, we know many of its properties and have ascertained most of the conditions necessary to its existence, which cannot be said of any epidemic influence. Besides, the term malaria is applied to an agent which causes only one series of phenomena, varying according to its quantity; it is another word, because only one species of theca, including the different varieties of malarial fever, with symptoms diversified according to their intensity, whereas epidemic influence is used as an explanation of the origin and spread of certain diseases, the exact causes of which are still involved in mystery, such as influenza, cholera, and the increased diffusion and fatality of other diseases, such as cancer, which are more or less precisely known, such as the botulism, fever, and even the transgression beyond its ordinary limits of malarial fevers. It can hardly be supposed that it is any single influence which favours, origi-
Due to all these different diseases. But the time is now much a vague manner the following quotations show. St. Beart, after alluding to the causes of various epidemics and their attempts at explanation says, "it is indeed vain to speculate upon this subject, all that we can say with certainty is that there must be some distempered condition of the circumstances around us, some secret power that is operating injuriously upon our system and to this we give the name of epidemic influence."

Miasmatic diseases may in the same way become truly epidemic not that they result directly from this concealed influence, but that the predisposition to them is greatly increased by some unknown cause so that an amount of miasmatic exhalation more or less which may be always floating in the air in warm weather may now produce its peculiar effects, which in ordinary seasons would be wholly unperceived. Hence probably the late prevalence of intermittent and remittent fevers, in portions of the middle and Eastern States, in which these diseases were formerly almost unknown, while the circumstances of those regions, in relation to the production of miasmata remained so far as could be discovered the same.
As in preceding years. "Although Jenner says Sir James 
Attenley "owing to the wide diffusion of the slave causes" 
(unsavourable seasons which at once increase the num-
ber of malaria and thatchepore both influence the 
prevent and deteriorating the quantity of food) "recently 
assume an epidemic form, yet it must be admitted 
that they are occasionally epidemic without these or 
any other causes save evident and appreciable limit 
being present, so we must concede them to some con-
dition of the air which we cannot recognize 
otherwise than by its effects upon the animal econ-
omy. There can be no doubt that the usual cause 
of the disease, make a more than usually strong impression 
upon the frame during the prevalence of epidemic 
influence in the air, but whether this activity is the 
result of increased intensity or incidence of the cause 
or greater predisposition of the individuals, or both 
confounded it is difficult to ascertain."

How very vague and indefinite the term epidemic 
influence is and is evident from the above decla-
"rations. How much better it would be, instead of 
fighting with the use of such a term, to endeavour 
"tect to ascertain what the particular change is that 
the constitution of the atmosphere undergoes in
111 Food, Practice of Medicine p.162 Vol I
21 Diseases of Satiety p.121
each particular case, what elements are added to or subtracted from it. The causes of disease, as well as the means of ascertaining them, are as doubtless as precise, and their effects regulated by equally definite and unchangeable laws, as any of the other phenomena of nature and it is on this consequence your comparative ignorance of the subject as yet, that they appear to entertain and regularize. It must be allowed that the phenomena of the sum which constitute a living body must modify the influence of external agencies upon it, and thus render their action more obscure, than in the case of dead matter, but even these phenomena must also be regulated by as definite principles, as those of any other department of nature. The same remarks apply to the term predisposition. It also includes under a single indefinite term, innumerable different conditions of body which we do not understand, and therefore find convenient to bundle together under one in this manner; and implies in a general way that in each particular case there is some condition of the system which enables the more immediate causes of disease to prey upon it. Have already shown the importance of discovering what
This state is in relation to each particular disease, and an equal importance attaches to a knowledge of the intimate nature of the epidemic influences in any case.
Malarial Fever

Parts II and III

Symptomatology and Treatment
Symptomatology of Malarial Fever

The malarial poison may be considered to have one comparatively prolonged and perfect latent period, after its introduction into the system before its effects manifest themselves of obvious symptoms, and many comparatively short and more or less completely latent periods between the manifestations of its effects in those more marked symptoms which constitute the symptoms of the disease. In other words, it has a long intergelbile latent period always well marked in which characteristic it resembles the contagious fever, and other blood poisons, and many short intergelbile latent periods, as well as always, so well marked, but almost invariably more or less decidedly indicated, if the disease does not prove fatal before it has completed its stages gone gelbile. This is the great distinguishing symptomatic character of the malarial from other fevers. These intergelbile latent periods are called when more marked, intermissions, during which however the patient cannot be considered as free of disease any more than strictly speaking he can in the antigelbile latent period, while the malarial poison...
is circulating in his blood, just for the time it is true because dangerous and its strength exhausted but steadily and treacherously destroying the material for another vigorous attack on all the vital functions. When the intertubercular latent periods are imperfect (that is when the symptoms of the poison merely appear, but do not disappear) as sometimes late with difficulty observed, they are called intermissions. If they cannot be perceived the fever is said to be for the time continued, for the time lay, because the symptoms of fever produced by the maleriarial poison are it may be said never recovered from without assuming a paroxysmal form, that indicates the tendency to intertubercular latency of the poison; if they were the disease could never be said with certainty to have been malarial fever. The duration of the intertubercular period and the intertubercular periods of latency both depend on the intensity of the poison, the quantity of which circulates in the blood, and the powers of resistance of the individual against its effects. When an individual has inhaled a large amount of the poison the febrile symptoms come on rapidly; if the intertubercular latent
period is short, perhaps less than twenty-four hours, and the interefebte period if well marked is short, or more frequently it is imperfectly developed, or not observable, in the febrile symptoms do not occur only for a short time or more frequently only abate a little or perhaps show no signs of a reaction until the patient presents at all for several days. On the other hand, if the quantity of poison injected be small, or the powers of resistance of the patient great, the interefebte latent symptom period may be very prolonged sometimes as far as nine months, and the interefebte period will be distinct and also longer lasting more than two days or even a week. These being the general rules which regulate the latent periods, it is that their length and distinctness are regulated by the quantity of the poison it follows that by their duration the danger and the fatalitity of any case of malarial fever may be estimated.

It thus appears that the Negroes, foregoeris, and nomenclature of the various forms of malarial fever, are obtained from the observation of its latent periods, their length and completing
2. Classification of Malarial Fever

As this disease in an etiological point of view is correctly named Malarial, so in a symptomatic point of view it is properly denominated Paroxysmal Fever. It is the type of Prolactile diseases, each paroxysm of it when well marked, presenting in the manner most characteristic, the succession of symptoms or phenomena which constitute the nosological definition of a fever. Great variations are admitted in the type of the Malarial Fever, as regards the degree of remission, intermission, continuance, or malignity of its symptoms. In different persons similarly situated as regards circumstances occupation etc., at different places at the same period at the same place at different periods and even at the same place at the same period—all in the same season.

2. In the same persons at the same place, at the same period of different seasons or at different periods of the same season.

3. In the same individual at different periods during an attack of the disease.

4. In the same locality during the prevalence of the disease at different seasons of the year, or in different years.

5. In different quarters of the globe.
There is every reason to believe that it is the same disease produced by the same poison that presents all these variations of character according to circumstances. The circumstances on which the variations depend are equally diversified. They may be stated in general thus: 1. The degree of perfection of the condition of development of malaria in the soil. 2. The degree of concentration in the atmosphere. 3. The length of time which the individual has inhaled that atmosphere. 4. The quantity of poison which he has imbibed. 5. The strength of special powers of resistance of the patient's constitution. As a general rule the more concentrated the poison, the larger the quantity of poison taken into the system, the less the power of resistance on the part of the patient, the less marked is the tendency to intermission of the symptoms, as regards its length and completeness, and the greater danger of issue of the disease.

Another argument and practically the most important in favour of regarding all these varieties as one disease is that the essential and radical remedy curing them all is the same, while the treatment of special symptoms and complications must be conducted on general principles, and may
It cannot be safely left to the judgment of the practitioner to determine whether a person has intermittent fever, remittent fever, or a fever of longer or shorter duration. The following table may assist in the identification:

<table>
<thead>
<tr>
<th>No.</th>
<th>Eponym</th>
<th>Alphabetical Symbol</th>
<th>Frequency of Paroxysms</th>
<th>True Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ague</td>
<td>A</td>
<td></td>
<td>with single paroxysm</td>
</tr>
<tr>
<td>2</td>
<td>Double febris</td>
<td>aa aa aa aa</td>
<td></td>
<td>with double paroxysms</td>
</tr>
<tr>
<td>3</td>
<td>Double tertian</td>
<td>A B A B</td>
<td></td>
<td>with single alternately double paroxysms</td>
</tr>
<tr>
<td>4</td>
<td>Triple tertian</td>
<td>A aa A aa</td>
<td></td>
<td>with double alternately single paroxysms</td>
</tr>
<tr>
<td>5</td>
<td>Triple quartan</td>
<td>A B C A</td>
<td></td>
<td>with every third paroxysm absent or well developed</td>
</tr>
<tr>
<td>6</td>
<td>Tertian</td>
<td>A - A -</td>
<td></td>
<td>with single paroxysm</td>
</tr>
<tr>
<td>7</td>
<td>duplexis ter.</td>
<td>aa - aa</td>
<td></td>
<td>with double paroxysm</td>
</tr>
<tr>
<td>8</td>
<td>Quadrant</td>
<td>A - A - A -</td>
<td></td>
<td>with single paroxysm</td>
</tr>
<tr>
<td>9</td>
<td>Duplexis quar.</td>
<td>aa - aa</td>
<td></td>
<td>with double paroxysm</td>
</tr>
<tr>
<td>10</td>
<td>Double febris</td>
<td>A T A -</td>
<td></td>
<td>with single paroxysm</td>
</tr>
</tbody>
</table>

Remission more or less marked

Remittent Fever

Its exacerbations may adopt any of the above types, or it may present as remission for some days, when it is said to continue for the time, or it may become epidemic, prevail in towns, and be, marked by peculiar symptoms, and rapidly settle, when it is called Yellow Fever.
It would be impossible within the time and limits which remain at my disposal to attempt to describe all the varieties in the mode of accession, combination, and duration of the symptoms present in each of the above types of malarial fever, among the same type at different times, in different individuals, and in different places. It is truly a fashion disease, and an epidemic even, of the different descriptions get given by all the authors who have written on the subject would fill a large volume. I merely propose to state a general view of its symptoms and treatment, and practically this is usually the most useful manner in which it can be discussed, for as it is so extremely liable to variation even at different periods of the same attack in the same individual that any precise description which might be given or any fixed method of treatment which might be laid down, would be extremely liable to fail, and so mislead the practitioner who might rely upon them, in any case. This remark applies more particularly to the more intense and fatal forms of the disease, those in which, above all others, prompt and judicious treatment is of the most vital importance.

In the table of malarial fever, taken from the usual physiological definitions, I have divided its varieties...
into two claps, the Intermittent and Remittent, according to the method adopted in works on the subject. The Intermittent between the close of one paroxysm and the commencement of the next, there is an absence more or less complete of what are usually known as jeté symptoms. This period is called the Intermission. As truly as I have said before a latent period of the disease, or period of incubation, is much more to be expected than a latent period of its mature disease. The space between the commencement of a paroxysm and that of the one following is called the Intermission, it includes a paroxysm and an intermission. In the Remittent there is at no period a complete absence of the phenomena, but the intensity of these fluctuates alternately upwards and downwards, thus indicating the paroxysmal and latent tendencies. The period during which the symptoms are aggravated is called that of exacerbation, it more or less closely approaches a true paroxysm, that during which they abate is called the Remission, it approximates more or less complete latency. There is however no exact line of demarcation between an Intermittent and a Remittent Malarial Fever. The more severe forms of the former gradually insensibly into the milder forms of the latter. It would be entirely a matter of opinion with different practitioners, whether a certain
case of Paroxysmal Fever, would be denominated Sub-
acute Ague, and described as presenting certain lin-
perventie symptoms during its intermission, to be
dalled Remittent and said to have a very perfect remi-
tion. Each individual might be judged by an arbitrary
standard of his own. For example Dr. Geddes, states that
in the statistical tables given in his work, he has called
all the cases Intermittent, in which the pulse was ob-
tained during either morning or evening. Hospital Cases
have descended at any period of abatement of its symp-
toms below 79 beats; all those in which the pulse was
above that standard, he classed as Remittent. Now
here is no doubt that some such standard must be
adopted, and none could be more proper than the
pulse as its variations could be ascertained with accuracy,
but any classification dependent on any one symptom
is very artificial, especially if that symptom be 2 min-
ute as the variation of one or two beats of the pulse
in a minute. Dr. Geddes himself was perfectly aware of
this remark. "It must at the same time be observed
that the histories which have been giving Cemittent
and intermittent fevers are not found so useful to the
practitioner, when the disease comes actually before him,
as they might have been had both diseases been
considers as varying only in degree; and as presenting
the same indications of treatment in all their aspects."

Again when Remittent Fever, or lighter malignant Fever
is very severe, and its Jependant phenomena is regular
for some days, that its Premonitory nature is not
perceived, it cannot be distinguished symptomatically
from the ordinary continued Fever of the Species
which especially attacks persons recently cured in those
affections and is dependent on the heat of the Sun, Conjoined
with intemperance, and has no connexion with Malaria.

Again lastly when malignant Fever becomes its most mal-
ignant form, either from peculiarities in the seasons in
which it occurs, or in the constitutions of the persons
whom it attacks, quickly altering the quality of
the blood, and acting powerfully on certain organs of
the body, and finally fatal with unusual rapidity
and frequency, it cannot be distinguished from what
is distinctly described as Yellow Fever, and regarded
by many as an entirely different disease. It appears
clear to me that if there be such a disease as Yellow
Fever, specifically distinct from Malignant Fever, all the
conditions of existence and symptoms of many of the ep-
themics which have been described under that name
are perfectly reconcilable with the idea that they were
Clinical Illustrations of the Diseases of India
J. William redder M.D. 1846
nothing more than Malarial Fever in its most malignant form prevailing epidemically, and entering cities in which it does not usually reside, on account of its poison existing extensively and in a more concentrated form than usual, because of some peculiarity not so favourable to its development. I do not enter into the question further at present. I would only remark that the view of yellow fever as a malarial disease, if the not correct can do no harm, as another more appropriate treatment has been advised for it than that which would follow the opinion of its nature; whereas if the correct, incalculable mischief would be the result from opposite opinion, since it would lead to the adoption of the specific mode of treatment which would gain us comparative control over this perhaps most fatal of all diseases.

Now the essence of Malarial Disease, is a succession of febrile paroxysms. These febrile phenomena may be exhibited alone, and still constitute the disease. But they are almost always more or less complicated generally moderately so, sometimes even extreme degree with other symptoms, dependent upon the action of the poison upon certain organs of the body, either directly, or through its influence on the blood and
Nervous System. These local affections are, strictly speaking, not complications confined to the cases in which they occur; they are merely the effects of the action of the poison, more irregularly distributed than usual, and concentrated more upon certain parts, instead of acting more or less generally and in a comparatively mild degree upon the whole system, or perhaps its effects not only more irregularly distributed but more powerfully acting upon all parts of the system. In the same manner any extreme or abnormal development of a portion of the vital phenomena themselves may be called complications, as an unusual duration and intensity of the stage of rigor, an degree and duration of arterial reaction, and death either within that stage, or a large amount of evacuation and great exhaustion in the ensuing stage might each with as much justice be called complications of the fever, as extreme gastric irritability or violent delirium; for in the latter is always coldness of the patient during, so is there invariably anorexia and almost always some degree of nausea, green vomiting accompanying a jaundice, if these must be accentuated reaction beyond the normal standard to constitute fever as there is always more or less disturbance of the brain and nervous system, and so on, and extremes gather.
These results which are all due to the action of the same agent more or less directly, are equally observable giving abnormal complications. What I mean is that what are usually called complications of malignant fever are not phenomena peculiar and confined to certain cases, but mere exaggerations of those symptoms which may be observed more or less in every case. For example, the blood is always affected. In some cases it is unusually thickened, the venous system is always acted upon, in some cases it is unusually excited, motion oppressed, and so on, with the other organs and functions of the body. Inflammation, that is change of structure, is by no means a necessary accompaniment of these special or local developments of the symptoms of the disease. It is not always frequently occurring, but generally it is slight. I believe that any symptoms which it would have given rise could not be distinguished from those of the local determination of blood and irritability of the organ, the effects of the malarial poison, except in the case of the least along when the stethoscope comes into play.
3. Description of Malarial Fever

In order to facilitate and abbreviate my description of malarial fever, I will take a single paroxysm as a type of the disease, all the varieties of which are exception of such or more or less similar phenomena constitutes. As a typical paroxysm I will take one presenting symptoms of average intensity. I will then enumerate the symptoms or groups of symptoms, local or general, which in aggravated cases are most prominently developed as to constitute what are described as complications of the disease, as they occur in the various various stages of the paroxysm.

In accordance with this plan I proceed to describe the group of symptoms which constitute a typical paroxysm of fever, as representing the nature and order of the phenomena which characterize all the varieties of malarial fever, and indeed of fevers in general. Take for example an average paroxysm of such intermittent. A paroxysm is usually and conveniently divided into three stages, the hot, the cold and the sweating, followed by a period of abatement or disappearance of the symptoms of fever, called when complete the after-period of the disease. Speaking then of the malarial disease, not of a paroxysm, this most correct today that it consists of a constant
Evolution of four periods, three of them included in each paroxysm and the fourth preceding it. This latter, during which the disease cannot be halsted, and on which more or less latent is equally important as the other three, since as before said we judge for the intensity of the disease and favor upon about classification and nomenclature of it.

A Formal Description of a Typical Paroxysm

Cold Stage or Neer.

Sometimes this comes on gradually the regular chawing being preceded by fever glider or shorter duration, characterized by symptoms indicating the first beginning of the disease, or the paroxysm, or the transition into them from the antiparoxysmic or interparoxysmic latent periods. This is sometimes called the Remon with or Gormative Phase but does not deserve to be regarded as a distinct period as it runs on the one hand into the latent or inapparent period and on the other into the cold stage, constituting the frontier ghastly their territories between which an exact line of demarcation cannot be drawn. It would be as proper to describe as distinct periods the transitions between the cold and hot, hot and sweating or evocating and apparginal periods. However, it is important to attend to the first or so-called...
frommitible symptoms of the disease, because if recognised at this early period it is more easily arrested if the use of proper remedies, than at its more advanced stage. They are aptly expressed by the term malaise borrowed from the French. They begin with mental languor or irritability, by restless limbs, and loss of appetite. The patient feels not quite himself, but does not know exactly what to complain of. He is usually fatigued from ordinary exertion, and very inclined to sleep. Stitches himself and yawns frequently. Pain in the head, back, and limbs succeed with slight sensations of cold. Perhaps alternating with the feeling of heat the pulse may be felt at this time increased in frequency, and the tongue may be observed to more of rip gushed. Such symptoms may gradually increase from the time of their first appearance, till they pass into a regular rigor, or they may appear for several successive days, and pass away again perhaps with slight sweating. In the latter case they might be called formative paroxysms. The symptoms just described probably indicate the first depressant action upon the nervous system of the poison, which has been circulating in the blood, and gradually developing itself to the particular tissues on which it gives origin. During the period of incubation after a variable period the symptoms of the late stage
become decided. Now, along with increased headache and pains over the body, the patient feels very cold and chilly. The convulsive terror into which he is thrown may be so strong as to shake the bed upon which he lies, and the sensation of cold may be intolerable. He frowns with great distress. The skin becomes dry, but pale. The skin, weats from the cutaneous capillaries, and the circulation becomes weaker the extreme part of the body, consequently, the skin becomes cold, blanched, and thumbed. The features a ghastly appearance, and the rest of the surface the aspect known as cyanosis, and the roots of the nails, lips, and the tip of the nose assume a purplish hue. The patient experiences dizziness and a feeling of uneasiness as at the foregut, frequently accompanied by vomiting, and a sense of oppression at the chest with dyspnea, and hurried or sighing inspiration. The heat of the internal part of the body also perhaps already augmented. Just the dejections are diminished, giving rise to thirst, anorexia, and usually constipation. The urine, however, remains of normal quantity, perhaps increased, probably from diminution of the cutaneous exhalation. The blood frequently from being through the cutaneous capillaries seems accumulate in the internal parts, the organ upon which the burden of receiving the
greatest quantity beyond its normal share is the spleen, which in consequence of the great vascularity, rema-
able elasticity, and consequent distensibility gets its structure becomes enlarged to receive the blood which has diverted its normal channel, from extent amount with a capacity unparalleled in any other structure of the body except that denominated erectile tissue. This enlargement of the spleen can be detected by percussion among the lower flanks of intermittent fever, and of previous enlarged the organ may sometimes be felt beyond the margin of the ribs, at this period. All the other internal organs alike no doubt suffer congestion also at the same time according to their general types of vascularity and lax-
ty of structure; the stomach, hence the feeling of un-
earthly in this region, and one cause gets irritat-
ability; the liver hence the sensation of weight in the left hypochondriac region, and perhaps the quantity of bile sometimes thrown up; the lungs hence the feel-
ing of dyspnoea; the brain hence the increased languor and exhaustion, perhaps delirium; the heart, upon this NHS, most of all must the column of blood thrown towards acts most directly and dangerously, for already weakened if the destructive action of the poison upon the nervous centres from which its innervation
to derive, it is well with our persons if the accumulation of blood in its large vessels, which it is unable to propel through the existing (arterial) capillaries.

The function of the nervous system which presides over the functions of organic life appears to specially act upon the finer poison named the ganglionie, and its part of the cerebro-spinal system connected with it. One arrangement of the innervation of the extreme vessels of the arm must prove to the "piastrin" into which they are thrown, and some alteration probably diminution of the function of the Pneumogastric nerve must have taken with the name, and irritated that general, the jeolene of the heart's action, and feeling of oppression. The suspension of the secretions also and the painful sensations experienced also point to the nervous system acting at fault.

2. Hot Stage

This gradually takes the place of the former, and is most obviously distinguished from it by action of the circulation, accompanied of menace heat, surface the heat action becomes more powerful, the pulse fuller and stronger, the cutaneous capillaries are again filled with blood, the pale color of the skin is succeeded by florid warmness, and along
with this change the sensation of heat and the chil-
ding disappear. But this vascular reaction does not
stop when it has reached the steady state health, it
passes beyond it into the opposite extreme. The head
and face are flushed with unusual rapidity through the
veins, the cutaneous capillaries become overstrained
the surface of the body is now hot and the char-
acteristic chills observable in the face; another
congestion of the internal organs succeeds the
fever. The headache and epigastric misery are
increased, the former often accompanied by delirium,
the latter with increased nausea and vomiting. If
the vomiting has continued so long as empty
the stomach with alimentary contents it now con-
ists principally of bile. The other symptoms are still
farther diminished than in the acute stage. The
head and EXAMPLE get the mouth and throat puffy
but intense thirst, and the bowels are usually very
constipated. The urine alone all is attended by some
scanty and high coloured but without sediment.
The amount of increased heat cannot be accounted
for by the augmenting capacity of the circulation for this
is not always proportional to it. It must be due to a more
metamorphosis of the tissues, that Joseph which is believed
the the source of the normal degree gained lies in a state of health. This increase is probably due to the controlling powers in that part of the animal system which regulates this process, in other words, elimination of those artifices which prevent the living fabric from becoming entire the force of ordinary chemical forces, and which under these circumstances to the physiological processes of the animal economy. The more than ordinary tissue change is accompanied by less than ordinary secretion especially by the most important and observable channel, the kidneys, so that the effete matter must accumulate in the blood, and so favour the action of the poison which we have been forming upon such materials. The cutaneous capillaries which among the preceding stage had been apparently spasmodically contracted, now begin to be on the contrary, paralysed and to dilate before the advancing current of blood within which another proof of impaired innervation, it can be imitated if Bernard's experiment of exciting the sympathetic with acrid c. sweating stage.

During this stage the abnormal phenomena of the fever gradually disappear, and the expected secretions return. If the latter the copious reappearance of the cutaneous
one, is the most marked phenomenon, and first, it moves to the stage. The skin becomes blanched, moisture appears on the face and upper part of the trunk. It decomposes the whole body rapidly into a caeious mass, and acts thus on all the febrile symptoms alike. The pulse becomes soft and slower, the skin cool. The headache, delirium, the nausea and vomiting, the pains over the body, the uneasy sensations at the stomach, and the dyspepsia all disappear. The various secretions are resumed, and as the products of the organization of the tissues had been sent up, and accumulating in the blood during the inactivity of the excretory organs in the last stage, they have now abundant materials toward upon, and being strongly stimulated secretion and once more unfettered, their results and their function are very copious. The urine is abundant and is loaded with excreta that it cannot lose them in solution and cool, it therefore exhibits a large sedimentary deposit; the skin as already said is bathed in a profuse sweat; the intestinal secretion often becomes so copious as to determine a diarrhea. Such abundant discharge have been denominated fatal critical, and a great deal of controversy has arisen in regard to them; some supposing that they
cure the disease by evacuating its morbus morbi; others on the other hand maintaining that its appearance is merely coincident with and indicative of spontaneous abatement of the disease. As in many disputes points the truth lies between. They are doubtless to cure the disease by purifying the blood from its retained fecal matter and maltord as the same time from the malleable agent and its products, to some or less extent. It is equally true that they do not appear while the intensity of the disease remains, and that this must be broken by other means before spontaneous recovery before they can come into play. The excretion is probably favored by an accumulation of fluid in the blood as well as their respective elements. Large quantities of water are drawn during the heat of fever, but the urine is greatly diminished, and the secretions of the chylomicronous membrane and glandular organs, in which an incredible amount of fluid matter is always passing out of and into the blood again for a kind of extra-vascular circulation in health, are stopped. The urine being dry and hot is generally allowed that its secretion is diminished like the rest. Still, while its heat augments temperature a large amount of fluid may pass off with tremendous
form, and I think that it and the lungs combine much of the water although during fever must be pot
and that, for I do not imagine that otherwise the blood
and tissues cannot contain it all. The completion
of this stage terminates a paroxysm of the fever, and
is followed by the period of interparoxysmal latency or
intermission. This is when nearly or quite perfect
period is given a complete health. Some exhaustion
remains, the usual after preceding paroxysm, that may
be some frequency of pulse, and far on the tongue and
the appetite not quite restored nor the patient expect
what is conjecture: but in all cases there is com-
parative an in a few perfect apparent abatement,
so far as external indications go, health; though
this cannot strictly speaking be said. The entire de-

came; for little the malaria circulates in blood
and if not counteracted by the proper remedy, will
after a variable interval, introduce the phenomena
which have just been described as a paroxysm of
fever, perhaps more or not maybe less aggravated than
the last. The more sleep marked occurrence of this per-
iod is great feet importance, for it indicates the
cutting up of the disease into separate paroxysms
Page missing in original volume
Page missing in original volume
and the more or less completion of their three stages. In this way the disease system has the opportunity at short intervals of throwing off its excreta and part of the poison and its products with them, and at the same time of rallying more or less completely from its effects. In this way the blood does not become so depraved and disorganized, nor the strength be exhausted, as if the patient were the subject of one long paroxysm corresponding in duration to the sum of all the short ones. The length and duration of the appyrexia therefore is obviously a most important element in the prognosis, as we have seen it to be the most important in classification and nomenclature of the forms of the disease. Why the effects of malaria reappear occasionally exhibiting themselves, thanks again and again, become latent, has not been explained. The conditions under which this poison is generated, the most important of which is the course of remission, rather favor the idea that it may be in such a state capable of acting after the manner of a ferment upon the blood. Adopting then the Sympathetic theory we may suppose that during its first period of incubation or ante-fibril state period it has gradually established the vital fluid that at last this becomes so alterative.
or poisoned as break upon the human system and thus evoke the phenomena of a febrile paroxysm.

He can conceive that after a violent effort during a paroxysm, the system has been able to withstand the effects of the poison, and has succeeded in its third stage in evacuating and throwing off so much of the matteries morbi in the bladder, that what is left is not sufficient to have any appreciable effect upon the economy for a time. But respect in the language of dyspnea, a certain minute portion of the fermentable material remains to act upon the fermentable matters in the blood. During a second period of incubation the slow process of fermentation again goes on, and in due time sufficient matteries morbi is reaccumulated in the blood to affect the system much in manner as to reproduce the febrile symptoms. It is difficult to understand how these things in many cases of intermittent fever a complete absence of symptoms during the interfebrile latent period, and to sudden an attack of fever, if the morbid agent has been practically lying in course of formation degenerate all the time, for this length of case we would expect the symptoms to disappear again in degrees also of the same manner that he has been a patient subject to intermittent ype "sit down by a meal with a
poor appetite, and he had scarcely half-finished when
all at once he felt indisposed, even these appetites van
ished and the anguish you set in. Particularly澳门
he adds that there was no arrangement whatsoever
susceptible in his sleep, urine, abode evacuations, toge
or the functions of any other organ during the twenty
four hours that preceded the episode of the 10th March.

The Symptomatic theory fails to account for this remarkable
fact, but so does it to explain the similar one in
unison the contagious fever boutick it is applied that
their autochthonous latent period like that of Malarial Fever
conscience its interpetri, ones, are marked by no indica
ations of the gradually developing poison, till the fever
more or less suddenly sets in. It is also quite incapable
getting at the reason of the remarkable uniformity in
the duration of the interpetre period plateau of the
Malarial Poison. Heath in the time of the termination;
why, for instance, a Secular should continue generally
latent for one day and a Quantan for two, in that
why the fever should follow any type with an approach
to uniformity and not be a Secularian a Secular or
a Quantan alternated or indifferent. It leaves pines a tabular
view of the poison reception of the Parasynms in
case of Quantan after which heobms with feet
accuracy during a period of 24 months, showing the
remarkable fact, that not only the period between each
refractile aperiodic paroxysm was in accordance with Quan-
tan type, but that after intervals varying from 8 to
63 days, remission from the disease, the day upon which
its relapses occurred, was with three exceptions exactly
that upon which a paroxysm would have fallen had
the disease gone on repeatedly without interruption during
the twenty-seven months. In one of these exceptional
cases the fit took place, after an interval of 63 days
upon the day before that on which it was due, and in
the other two instances the relapse occurred after in-
tervals of 12 and 72 days, the day after it ought to have
appeared had it been repeated. The Quantan period
of interruption all through 11
This irregular periodicity of the disease cannot be ex-
plained by any modification of the traumatic theory, he
can only refer it to some law regulating the bodily func-
tions which exhibit itself in diseases as well as healthy
conditions of the system. Dr. James compares it with a
very similar phenomenon observed in respect to the cal-
amenia, which having been suppressed for many months
not infrequently appear on the very day upon which
the monthly period would have occurred, had no
such suppuration takes place."

B. Special Modes or Local Complications in which the Disease generally exhibits unusual intensity.

1. Cold Stage. The cerebral portion of its products may have such a powerful effect upon the nervous system that it can scarcely recover itself sufficiently. Only about reaction, or death may take place without this being accomplished. The tendency to a fatal termination is of syncope or coma, when the dyspeptic tendency predominates.

The pulse is excessively weak and frequent, or fluttering, the respiration being intermittent, clammy calms, with expectoration of the skin, constant retching, of matter swallowed or mucus with much thick with bile, generally also expectoration of fluid matter from the bowels, often as hemorrhagic tape. In fact, the patient in a state of collapse much resembling that of cholera.

The mental and voluntary powers not much affected, when the comatose tendency is most marked, sometimes gradually passes into coma, with complete insensibility, and laboured respiration, the pulse at the same time not accelerated, or even diminished in frequency and soft, and the skin cool, occasionally this form is accompanied by epileptiform tetanic spasms when the disease assumes either of these dangerous
Modifications, it is denomnated "longa time" feminicous and generally proves fatal, if not arrestit in the second or third paroxysm; if not in the first. Such symptoms may also appear unexpectedly at any period of the disease though its progress previously had given no reason for alarm. This fact urges the necessity of being prompt with use of remedies.

1. Hot stage. In this stage the danger the apprehended is from septic reaction, and atonement of blood to, threatening inflammation of the important internal organs, especially the brain, stomach, and liver. The Brain. The patient may be seized with convulsions, pain in the head, with thrashing of the Earth and temporal arteries and flushing of the face and conjunctiv of the eyes, followed by violent delirium; om with the same symptoms of atonement gushed to the head, throwings may supernumerarly passing into profound coma, with hecticous breathing in both all the symptoms of apoplexy, except, generally, the absence of paralytic.

2. The stomach. Pain and tendentre mitte opacititum with constant vomiting of bilious matter. After a time in very bad cases when the blood becomes discolored as it is said, that is much discomposure, barren hemorrhage takes place from the stomach, leading to the throwing up
black matter which is black and is the residuum of the stomach. This constitutes the black vomit of yellow fever. It is almost always a fatal symptom. The irritability of the stomach often accompanies the other symptoms, but generally it has more or less effect in relieving them.

3. Fever. Apparently very large quantities of bile are thrown up during the vomiting in this case. This has led to the belief that in some cases an injection of secretion of bilious matter takes place. Probably this is not often the case, for if so it would be an anomaly in the exception to the rule of the suspension of all the actions. It is more probable that in most cases the gall bladder has been previously distended and becomes evacuates with the effects of vomiting, the contents flowing into the stomach, and ceasing all the matter evacuated from that organ. In some cases after a lapse generally of one or two days, the function of the liver becomes apparently more suspended and the coagulating matter of the bile appears on the face. This appearance takes place in bad cases and is called Remittent and is the chief features which is hence named yellow fever.
3rd Stage.

Sweating Stage.

Severe exhaustion is most the head in this stage consequent upon the previous excitement, especially at advanced periods of the disease when the urate bones are becoming prostrate. This is an important point in treatment.

3rd Stage.

Appetite - when this period is imperfectly or not at all developed, and the disease assumes the partially intermittent or continuous form, and so runs on in disregard of remedies to about the end of the second week sooner or later according to the violence of the disease or labors of the patient. The heels for the reasons before stated becomes much deteriorated and the patient strung excreturizes what are known as typhoid symptoms in consequence made their appearance, such as, low muttering delirium, dry brown tongue, soreness on teeth and lips, tuberculosis in tonsils, ending down in his involuntary evacuations, dropping at the knees, etc. and the patient this comatose.
Sequelea of malarial fever

These generally occur in cases of chronic intermittent or after repeated attacks of this form of the disease, or of the intermittent type keeping intact before recovery. They are enlargements of the spleen and liver, accompanied by a cachectic state of the system, the most prominent feature of which is anaemia, and which gives a facility to attacks of chronic dysentery and diarrhoea. When the spleen and more especially the liver are much hypertrophied, serous or pleural effusions from obstruction to the circulation are frequent results. I will here notice some of these.

1. Enlargement of the spleen.

This is the most frequent and characteristic sequela of malarial fever. It is familiarly known as graphic cachexia.

It is easy to understand. Law as already observed the blood expelled from the surface of the body during the cold stage of fever, and, as men begin to form for itself in internal parts should make its way to vacate a greatly increased quantity into a highly elastic and distensible organ such as the spleen, and diffuse itself in some way through its extensive vascular pulp. He should also naturally expect a frequent repetition of this process leads to more or less permanent hyp
atrophy of the organ. So long as this is mere dependent on increased vascularity and distention, from accumulation of sero-serous elements, however arranged into pulp, the spleen will remain in its natural soft consistence, or perhaps will be more pulpy than it should appear, to a normal size with concomitant spirits from animal causes normal; but if it be accompanied by any degree of the inflammatory process, another have been an evacuation of liquor serous into substance, its fibrous tissue will be increased in amount, and this will be in duration in addition to the hypertrophy, which in consequence will be renewed more permanent. The former condition is more frequent in the acute cases of disease which occur in what climatic, and when so affects the organ incapable of rupture from slight external violence, and to give one to sudden death of hemorrhage.

Four cases of a fatal result on this weapon occurred in the 1st Vol. of the Trans. of the Med. and Phys. Society of Bombay, by Dr. Reddy, and one is mentioned by Mr. Inneshead, Dr. Playfair in a paper read before the Edinburgh Medical-Chirurgical Society on the 24th July 1837. At least one case which occurred in his practice while in India.

The most remarkable fact noticed in these cases was the very small laceration from which gatet de horsparge might take place and the very slight causes which might ac-
...reason it. In one case it was caused by the joint occurrence of a sudden jolt which was given to nature while he was carrying a bundle of sticks upon his back.

The condition of anaemia is so intimately associated with the disease of the spleen that it must be considered in connection with it, but the exact relation of the two results is not yet determined. It is uncertain whether the hypertrophy of the spleen and the impervious condition of the blood vessels to each other in the position, grace and effect of the area, or whether they are not both independently the result of the malarial disease; and the question will remain unsolved until the intimate structure and physiology of the spleen are no longer disputed points. We know that in many other cases enlargement of the spleen is associated with a decided state of the blood in which its white corpuscles are remarkably increased in number giving rise to the condition named by C. H. Bennett, Leuco
dysthenia, but I don't know that observations have been made as to the frequency of the occurrence of this condition of the blood in the anaemia resulting from malaria. Wood of Philadelphia considers it highly probable that Leucodysthemia "is very common in the malarious regions of the United States, in which disease of the spleen..."
abdomen," but he only mentions two cases in which it was ascertained to exist. In one of these it could not be
traced to have an intermittent or remittent fever, but the
spleen was enormously enlarged and the patient received
industrious use of Lumine and Ton. The other professed
fatal. Opas Kolliner was led to infer from his ob-
servations the red corpuscles of the blood become dis-
banded in the spleen or transformed into cells resembling
the white colourless corpuscles of the blood, we can
readily believe from the increased quantity of the cir-
culating fluid sent to that organ during the repeated
attacks of an intermittent fever, that the blood
would in course of time, have its red corpuscles greatly
diminished thus reducing the state of anaemia, and
present an increased number of white bodies as in
Leucocytosis, both of which conditions would be aug-
minted with the increasing, and become stereotypic in
the permanent enlargement of the organ. The recent observ-
ations of Dr. Henry Gray who finds that the blood
leaving the spleen is much less rich in red corpuscles,
than that entering it is in favour of the belief that
at least one function of the spleen is to destroy the
red corpuscles. On the other hand if the spleen be a
blood-elaborating organ, we may suppose that Malaria
of vitriolating and impoverishing the blood produces anaemia directly, and that the spleen called into increased functional activity deteriorate this condition becomes overstimulated and infected; and that this conjoined with the mechanical effect of the cold stage in heating it, leads to hypertrophy with chronic inflammation and destruction of this organ, as in the case of the liver in hot climates. It would seem that long exposure to malaria is capable of inducing enlargement of the spleen, without accidental attacks of fever, and remedial measures to improve the condition of the blood are most effective in the treatment of hypertrophy of the organ. Lastly, the anaemia may be the result of the malarial fever itself, or a mechanical result of its cold stage, as already explained, either in dependence of the anaemia, or they may both be partly dependent on each other, and partly on the malarial influence. The degree in which the spleen may become hypertrophied is very variable; from being scarce susceptible below the margin of the ribs it may extend down as far as the breast of the abdomen and occupy a near part of the abdominal cavity, weighing as much as ten or twenty pounds or even more. In these extreme cases it is always at the same time
The enlargement of the liver

This is the next most frequent result of chronic intermittent, and is probably due also to the frequent con-
egocations and irritations to which the organ is subject, giving rise to a low grade of inflammatory action, and
especially in hot climates combining with the other causes,
which induce the case in it. Its consequences are a
general pallor of the complexion which may become
more pronounced in accidie jaundice; dyspepsia; and
C. 'Dispass. This is frequently the result of a combina-
tion of hypostrophy, a change of structure in the liver and
spleen, producing congestion of the portal system veins
with the watery condition of the blood which concurs
with anaemia. It sometimes occurs without these
obstructions after the disappearance of chronic intermittent
and is supposed in these cases the veins of the
caput and changes of fluid from the blood & sweating,
which the system has long been habituated. For it
has been observed to disappear on a recurrence of the
paroxysms. As much has observed the urine frequently
be albuminous, but only temporarily. 

A diarrhoea and dysentery.

In the cachetic state of the system resulting from mal-

illuminated.
and with the impoverished state of the blood, and disturbances of the abdominal viscera especially the liver, these cases are very frequent, especially in hot climates being generally brought on by exposure & exertion. Indeed it is of opinion that there can be no question that much of the mortality recorded in India is due to the head of bowel complaints is though indirectly, not fairly chargeable to the account of malarious fevers, the malarial cachexia.

This is a general deterioration of the health resulting from prolonged malarial influence upon the system, accompanied and more or less dependent upon, the various local affections already enumerated, and chiefly exhibited in an impoverished or anaemic condition of the blood. The colour of the complexion is a mixture of pallor dependent on anaemia, and pallor from the bloated condition of the liver. It might be described as sandy. The conjunctiva has a smoky hue. The tongue is pale. There is great bodily fatigue, and depression of spirits. Palpitation of the heart occurs on slightest motion and a systolic murmur may be heard over it. There are pains in the extremities and a tendency to weakness and debility of the legs; frequent accessions of dizziness and irregular pulse symptoms. Appetite; loss of appetite vs.
Dielcast g. Lithę vol I P 33
III. Treatment of Malarial Fever

1. Treatment of the Fever

In discussing the treatment of this disease, I will divide it into A. Palliative, and B. Radical. I believe it can be said yet—what can be affirmed for no other fever, and open the cases in general—that we possess a remedy or a set of remedies, by the proper use of which it may almost in its best, or cut short even in its full career, by which the poison in the blood which produces it may be neutralized so that its effects cease, or the part of the system upon which it acts may be eteeted against it, so that virtually it is annihilated. I therefore call the use of these remedies the radical treatment.

But there are also several other modes of treatment, which may be very judiciously and usefully adapted to palliate particular symptoms, and counteract certain special tendencies of the febrile movement, but have no power whatever in combating the cause of the disease, or eradicating it from the system. This is of the utmost importance therefore that these should not be confounded with the former, and I shall therefore speak of their employment as the palliative method of treatment. Here it must be observed that we possess the remedies included under the former head, we would be led to

...
in the treatment of malarial fever its expectant method which has now after long experience come to be chiefly resorted to in the management of the contagious febrile diseases of this country. For the means of treatment which I will have to enumerate under the second head are as applicable, e.g., jaundice, the various forms of febrile disease as typhus, to Pishus as to Bilious Remittent. I will speak of the Palliative Treatment first, so that it may receive due attention, and that it may not be eclipsed in the brilliancy of its more powerful companion—the Radical—which I will reserve for the last.

A Palliative Treatment

Indicating this I will follow as much as possible the order of the several stages of paroxysm.

A. Cold Stage

The indication in this stage is to bring about reaction. This is followed out by covering the patient up warmly with all the clothes, applying dry or moist heat to the surface of the body and extremities, and allowing hot drinks freely. It is frequently advisable to give an emetic at this period of the disease; if, for example, there be much nausea and ineffectual attempts at vomiting, and we suspect that there are offending matters in the stomach which ought
the got rid of Black lodging in this stage was brought into notice by Macintosh of Edinburgh, and strongly advocated by Mr. Skene of the Bengal Service. It has led states that it has quite gone out of use again in India, and at least of Philadelphia also disappoints yet. 

To the Edinburgh made careful observations on twenty two cases treated in this way, and the results to arrived at were, that it generally checked the fever and rendered it milder, but had very any effect in mitigating the succeeding stages. It was obvious beneficial in alleviating symptoms dependent upon internal congestion, such as biliary pain, oppression, epigastric mamma and tenderness with vomiting. Its effect in reducing the age of theтоксопсии, spleen and that of the liver also when it was appreciable was most marked, so much so that states thought this might from the fact against it in its favor. Its effect upon the posture was to render it help frequent more regular and smaller. In any case it changed the type of the disease into a more continued form, as from intermittent to tertian.

A lateral conclusion from a review of the whole case was against the indiscriminate or even frequent use of these. 

Stokes strongly recommends it in those cases where
Edinburgh. Ind. ong. Jwm. Bob xxx
This is recurring inflammation gone some internal agen. I conceive the medication in this as well other ulcer. Diseases to husband the strength as much as possible. Seem therefore that blistering can't cure the disease unless materially shorten a single paroxysm, the question ought to be not how often and in what cases it is admissible, but how often and in what cases it can be omitted without danger to the patient, or the sacrifice of more benefit than counterbalance the loss of so much of the vital fluid, which is equivalent by strength. It should be deemed therefore as a general rule for those the cases in which concurrent inflammation internal agen demands its use.

If reaction do not occur and collapse is threatened, stimulation must be employed vigorously both internally and externally. Internally, the preparations of ammonia, the bitter, oil of turpentine, capsaicum, and if these fail, brandy or other spirits but these should be avoided except when necessary as their effect is injurious when reaction takes place. Externally, friction with hot turpentine, mustard cataplasms, or other ingredients to the trunk and extremities; or the whole body may be immersed in a hot bath. If the symptoms be comatose, the head must be shaved and a blistit applied over the whole neck.
Philadelphia

Dr. Wood states that this method is much more effectual than applying it to the back of the neck. If the pulse at the same time be pretty full, and there be any signs of dilatation of blood below the head, the treatment must be adopted proportionally to the reaction, which will presently be described for the apoplectic form cases.

I. Hot Stage

Now on the other hand, the indication is to moderate reaction. This may be done in ordinary cases of light clothing, free ventilation, cold sponging of the surface and providing cold or ice drinks. The use of refrigerant baths are also indicated to promote evacuating, such as the lunar ammonium acetate, nitrate of potash, small doses of purgative emetic in not contagious acute irritability of stomach. Dr. Wood of Philadelphia recommends alone or with all others the offensively scented Freiland prepared with citrate of potash as its base, and citric acid and carbonate or bicarbonate of potash. It has the double effect of soothing irritability of stomach and promoting aperientosis, and may be combined with small doses of morphia.

If there be much determination of blood to the head, threatening inflammation there, with delirium and tendency to coma, the cold douche must be applied to the body and especially to the head from a considerable
Light, but the temperature of the surface is lowered.

The patient feels cold. Bleeding may be advisable. In severe cases, increasing the heat of the surface is beneficial. The patient may benefit from warm applications. In cerebral affections, the hydrate of cataracts lining the most useful for this purpose. Ice may be applied to the shaven scalp with intense after the touch.

If these means fail to alleviate the head symptoms, especially if the Adrenalin be violent with strong vascular action and agglutinative symptoms well marked, bleeding cannot be undertaken by employing too small an extent as to make an impression on the pulse, taking the blood in a full stream, with erect posture, and marking its effect from twelve ounces to double that quantity will probably be sufficient. If the symptoms are less urgent, abstraction of blood for a smaller extent of cupping to the back of the neck may suffice along with the measures above mentioned. If not prevents irritability of stomach, tartar emetic should be employed to assist in moderating the circulation.

Irritability of stomach. After the organ has been fairly evacuated, sedatives may be employed to allay its irritability, one of the most effective of these is Carbonic acid in the form of the offensive smelling or colorless carbonic acid water. Small doses of morphia, or
Opiate enemata, are also very efficacious. Hydrocyanic acid, bromate &c. Abstaining from drinking much fluid and using small quantities of tea instead. If inflammation of the stomach be indicated by pain in the epigastric region and tenderness on pressure, leeches must be numerous, applied, followed by a compression blister, or even general blood-letting may be necessary. If congestion of the liver be evident, two leeches and external counter-irritation are indicated. Opium may be also necessary, and opium the favourite in affections of this kind is calomel, which may be combined with some other as jalap, colocynth, chauliut, or given alone in larger doses.

The Sweating Stage

The perspiration should be promoted to a moderate degree but not induce the too profuse. One should be taken that the patient be not exposed to cold thoughts, pain at this time. He should therefore lie again moderately covered up with blankets. The fomentation which is apt to occur at this stage should always be recalculated, and stimulants be at hand in case they should be required.

A Spleenish Fever

This is the proper time, if there have been no previous necessity to do so for the removal of the
use of purgatives, as they act more readily at this time than when given during the hot periods of the fever, and as they are required, another consequence is the danger of undue irritation of the gastro-intestinal mucous membrane which might bring on troublesome diarrhoea resembling other symptoms of the disease. It is one of the best means to promote the secretion of the bowels free, calomel is preferable as a purgative, especially in hot climates as it has the reputation of exciting upon the glandular secrections especially upon the liver. And as the liver is usually more or less injured in this disease, as indicated by the tendency to jaundice, stimulants are always an indication. Purgatives should always be resorted to in the employment of evacuations by this mode, so in the use of these let it be attended to that they cannot shorten the disease, and that they exhaust the patient. Beyond the point therefore of free evacuation of the bowels at an early stage of the disease, and keeping them regularly open afterwards, purgatives should not be pushed except when specially indicated; as by severe head symptoms, and then always with a regard to the strength of the patient. The apoplexy is also the most appropriate period for conveying nourishment into the patient's system. This indication is not of much importance in cases where this period is well marked and is coma
duration; it is in those in which it is imperfect, or even absent, that it becomes of the greatest moment, more so than any other item of treatment yet mentioned. In such cases this and all the other indications of the appecies fever must be attended to in the early stage, any other moment at which they are seen most appropriate when malarial fever comes on into the Continuous and Dyspeptic or Astatic forms expending the patient's strength of nourishment and stimulants daily and assiduously employed is the most vital important point in the palliative treatment. It is conducted upon precisely the same principles as the management of cases of the Contagious Continuous Fever of this country. Finally, the fact of the greatest importance in the treatment of Malarial Fever, and which should always be strongly impressed upon the practitioners memory and judgment, especially when dealing with the worst cases, in the Sepic, is, that however high the fever may run at a time, and however acute the patient's constitution may be, he never can tell how soon in any case alarming symptoms of prostration and collapse may exhibit themselves. The practical deduction to be drawn from this fact is, the as conservative as possible of the patient's strength, and then fend no
more profit by evacuation in any shape than is absolutely necessary to avert danger or death, by local determination of the disease, and involvement of some important organ; and not only take this dangerous step to knock down the patient's strength, but also be diligent in keeping it up against the disease by the use of easily assimilable nourishment and, when occasion requires, special stimulation.

Now, it would be a bad look out, if, supposing the radical treatment out of view, we were obliged to stop here and say that we had done all that could be done, if the use of the means already mentioned. Dr. George Johnson came to such a conclusion about forty years ago, and was unique in trust in evacuation by bleeding and purgatives combined with mercury (which he regarded as a kind of specific or radical treatment as I will presently mention), and he therefore used them unresparingly; and his example was followed by several practitioners for many years, and have as doubt would be so still, if they continued blistering within, that there was no sty in enchroma back and its adherent, a sufficiently certain and radical means of treatment surpassed all others. It is no doubt very mortifying for practitioners late obliged to
acknowledge that in truth he cannot succeed and he is unwilling to do even to himself, and according to views the means of treatment which are at his disposal except with the wounding idea that he is making the best of them, and of course I am inclined to attribute the ureterica which take place under their use to their efficacy. I will now pass to the radical method of treatment, reserving what I have been on the subject of mercury for that head, as I have been aware of many somewhat in the light of a specific in this as it has been in most other diseases. I may mention here that the use of the radical remedy does not in the least interfere with the means of treatment already described as palliative, which should be employed in the judicious extent recommended just as if we had no specific for the disease at all; the adoption of the one method does not exclude but goes hand in hand with the other.
How long a time for example should the to reconcile the minds of Practitioners in this Country to the system of the Contagious Sphers of this country of the expectant method which is now generally followed and the adoption of which is virtually a confession that they cannot cure the disease, can only guide in its course and assist antitoward symptoms? How long did they attempt to make an impression upon those of these litigating parties, mercenary, before they came to the candid conclusion that they were on a general war.
13. Radical Treatment of Malarial Fever

In speaking of the use of cinchone, I consider it to represent the active principles in a concentrated and more eligible form than any other lately known, and consequently almost entirely supersede all the antiparasitic or leeching properties of that substance. I regard it as the only effective remedy, whose leeching efficacy is also admitted in the cure of this disease, such as cinchonine, cinchonidine, and the other alkaloids of cinchona bark, berberine, and picrotox also arsenic. There can be no doubt entertained in the present day, what is the truth of the assertion that cinchone (in its typical sense) is the only true or radical remedy that we possess for the cure of malarial fever, and that all the other remedial measures which are employed with treatment are merely palliative, such as bleeding, purgatives, smectites, diaphoretics, and arsenic. These remedies (arsenic excepted as employed alone) are merely directed to the temporary alleviation or removal of certain mental complications, and have no effect whatever in removing the cause of the disease, or directly counteracting its influence on the system, and therefore can have but little in shortening its duration, while cinchone strikes
directly at the root of all evil, the nature made
miter blood, which is either estripted at once, or what
comes the same thing, renders the system prey against
its influence till it can be gradually rapproxated of the
various symptoms. He value of this remedy was long
ago pointed out by the experience of Bingle, Leghorn
Jackson, Clark, and Lind, in the treatment of the differ-
ent forms of malarial fever; but, strange to say, it
subsequently fell into disrepute and disuse, more es-
pecially in the tropics, where the worst varieties of the
disease occur, and in India in particular, Chief
this, said in consequence of the strongly stated and
threatnously maintained opinions of James Johnson
published in his work, "The Influence of Tropical Climate
on European Constitutions" in 1813— and its place in
the confidence of the profession was taken and held
for many years by mercury, bromide of arsenic and
sulphur, Bloodletting and Purgatives. It is only within
the last comparatively few years that Sulphur has regained
for its parent remedy, its legitimate position in the
estimof Physicians, from which it ought never to
have been displaced. I cannot find in the elaborate
work of Dr. Craige on the Practice of Medicine, any allusion
the use of Sulphur in the treatment of Remittent Fever.
was in the article on this disease by Dr. Chapter in Sweden. Library of Medicine. (1840), a very slight reference is made to the use of bark as a disputed point, and Clark being mentioned as an advocate for its use immediately a commission was set in; Johnson and Burnett on the other hand being cited as authorities decidedly against it, and most weight is apparently attached to the latter view as the decided statements of Johnson are quoted. Sir John Rample in his "Diseases of the Army" (4th edition 1844) while describing his treatment of the remittent fevers which were prevalent among the British troops in their campaigns in Germany and Holland, thirty years before that time Rample states the importance he attached to taking the fever in the first remission of the poison, and after he had made what he considered the necessary preparation of the system for its introduction by blood letting, and after taking care of failure of the remedy by the difficulty of getting the soldiers to take a sufficient quantity of it.

Such a comparison of the authors of 1744 and 1840 sufficiently shows the small progress which the use of bark had made in a century, or rather the change into which the remedy had fallen. It cannot but strike one as a remarkable episode in the history of medicine that Noneone Bark (or its alkaloid), a remedy holding
in the present day, the singular character of indolent and
insufficient efficacy in the treatment of malnourished
fevers, standing preeminently without a parallel with
the whole range of the materia medica, without a rival in
drug medicaments used in the cure of any disease, the
only true and one specific now acknowledged, should,
after its merits have been carefully tested by the experience
and clear records in the writings of many able experienced
 physicians, have been thrown aside and subsequently
abandoned (as Dr. Bache has stated chiefly with reference to
India and the tropics) for nearly a quarter of a century, chiefly
on the fact of the testimony from some famous of the
example gone men, the father of another remedy, namely
gold; the use which it the manner the prevalent
was not only not favourable but even pointing mischievous
results and its subsequent effects decidedly injurious.

The much striking example shows how generally practical
and independent men there are in our Profession, and how
custom may lead culture. The enlightened culturist of
a department of science, with light and its practical results,
and melancholy, readily replaces the man of
fashion, this frequent of the newest, of the great or
choice of the most approved shape, but this latter
case (and perhaps many others not of standing with
history of medicine) can only be explained by reference to the
Vis indicatius naturae, that powers implanted in the human frame of nature, of repairing injuries inflicted by disease, occurring spontaneously, and disease, which of course it presupposes only too limited extent and for a restricted period of existence. It may be objected to these terms that it includes under the head gone ideal force all the various causes and influences, which proceed to retain texture and restore health, whose modes of operation and the processes by which they affect a case may be very different in different instances, and that it is therefore very arbitrary and hypothetical and few means very definite or exact. Still it is very convenient and quite sufficiently exact to express the general idea which it is of moment to convey, and therefore I will use it.

Shelume it is a consequence either of the total ignorance of practitioners on repair of the influence of this biotherapeutic nature, or their utter disregard of the fallacies into which they are apt to be led in estimating the efficacy of different modes of treatment, and the therapeutic value of the general action of the nature media, I shall not attach the importance to the effect of this agency in the cure of disease, that the Practice of medicine is so much the charactaristic of extraordinary resolutions of opinion, or the following.
more false facts than false theories in medicine. The physician
is apt to attribute to his own skill with the exhibition of remedies
that restoration to health for which the patient is indebted.
In many cases, perhaps, he of not entirely little efforts of nature.
Any more these efforts of nature may in some instances
be the cause, not a cure, have not only been un-
natural, but also of treatment, but have had to struggle against
the effects of well intended anecdote, but injurious
practice, in addition to the original disease.
The influence of nature with cure
gene-septic, when thus misunderstood,
its importance not duly recognized, is source
of fallacy in estimating the efficacy of medical
measures, is consequently the chief cause
of that discrepancy of medical opinion in regard
to the treatment of disease which has become stereo-
typed in the popular adage "Doctors differ," has
been the great element in the success of empiricism
in all ages, and is the root of the popular and
must be added Professional illusions
on medical subjects which prevail in
the present day, to the disgrace of a
Civilized Community, not to speak
of an enlightened profession.
At the same time encouraging the causes which frequently mislead the practitioner in his estimate of the course of the disease, places first "The natural tendency of most kinds of disease action to spontaneous abatement, which the action itself almost all remedies is inconsistent with, but which is very frequently mistaken for the effects of remedies used"

"The young practitioner," wrote Creda, "should be strongly impressed with the truth that in the great majority of cases the disease will end in recovery whether under treatment or not. He is not to suppose that every instance of recovery under his management is a cure. The prevalence of supposition is in a great degree attributable to the popular error that a favourable termination of disease is always owing to the means employed. Patients often assume improper and even injurious treatment, and believing themselves cured naturally require confidence in the practitioner, and in the supposedly sure remedy as much toward, obviating the evil by combining the popular mind with accurate notions on this subject. But they should especially guard themselves against a participation in the error" (2)

While I perfectly concur with the above remarks, founded on Philadelphia, I would venture I suggest that some of the older and more experienced members of the Profession, stand much in need of the caution which he implores on the younger ones, and that the errors which he accuses to the people are largely participated in by the Profession, upon whose conduct the concluding caveat of the above quotation is directly

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References & Notes

11. Meion's Pathology Practice of Physic, page 74
Aims thrown away.

The vis inertiae natural results require to be studied in a large number of cases without the use of therapeutic means; in other words, the ability properly to discriminate in other instances the results of the latter from those of the former. In other words, we must know the natural course duration and termination of a disease, before we can tell what impression we have made upon it by our treatment. On the same principle that it is important to observe the physiological effect of medicines unmodified by disease, by experiments on healthy men and animals, so ought it to be of equal importance to ascertain the pathological effects of disease unmodified by medicines, by the negative experiment of non-interference.

Such an experiment the homeopathists are carrying on on a large scale if they act strictly upon the principles of Hahnemann, and no doubt much exceedingly valuable information might be obtained from the results of their practice if correctly tabulated according to the aforementioned method of investigation of disease; though it cannot be said either to their intellectual or moral credit that they have either the face of science, or the benefit of their fellow creatures at heart in this point of view, in pursuing such a line of practice. I warn not however he so uncharitable as to suppose, though it would be greatly to their intellectual credit however much to their moral discredit, that all practitioners of homoeopathy are aware that it is a system of deception and quackery for I believe the whole thing like a monstrous delusion in the case.
of those who really are addicted to it) flowing out in
attention to ignorance of the Old Medicinal Nature
are illustrating on an immense scale, and in an ex-
treme degree of the truth of the remarks I have already
on this subject. So is it all clear that, even if they
had this particular object in view, of the good of science,
they would be justified in continuing such a system
with their eyes open to its utter inefficiency, and aware
of the delusion they were practicing on their fellowmen.

I am really convinced however that the young prac-
titioner would derive great benefit from serving an ap-
frenticeship for the first few years of his professional
life to the Homoeopathic system; for it is utterly impos-
sible for him to determine in any case of disease, the
parallel which he has never been run its own
course, what would and how much of there to attri-
ute to the effects of his medicine; what or how much
the natural tendency of the disease; for it requires an
amount of discrimination very rarely met with, even
in the past by the most experienced physicians judging
from the observation of a great number of cases which
they have treated, to determine with any approach to
certainty, what amount of benefit the patient has de-
creased in any particular case from a certain remedy or
combination of remedies.

Still the young physician, admitting that such a course
were justifiable, cannot turn to Homoeopathy without losing
his professional reputation and to administer medicines
s Reloaded water or lead filed, after the manner of allopathy, would as envenome the patient and expose him to allegiance and the imputation of quackery.

This subject of the influence of the indeterminate nature is one which enlarges upon and illustrates well chosen examples would afford ample materials for an essay itself, and I must therefore not enter further into it. I would merely mention as minor but very important instances of fallacy in estimating the efficacy of remedies, even when our eyes are fully open to that above mentioned.

The impossibility of prognosticating at the commencement of a disease, what its severity or duration in any particular case may be, seeing that the same malady varies so much at different times and in different individuals.

2nd. The method commonly followed of using several remedies in combination, or concurrently, or at short intervals after one another, in consequence of which their general effects are liable to be confounded together, and difficult to discriminate.

I conclude this subject by stating my belief that it is quite possible that a routine system of treatments of any form of disease, i.e., the system unrelenting of the most eminent medical authorities, and laid down in standard works on the subject—would might be generally adopted and followed by intelligent members of the profession, for many years, even though perfectly useless and even considerably injurious, without their being able to see its fallacy for the reasons already stated, and would continue the practiced, till perhaps suddenly overturned.
Of some bold and independent individual, who, happening, by chance from some accident, to have been through the篱间, had adopted another method and found it of superior efficacy, had talents and influence enough to lead the rest of the profession after him; or else gradually relinquished from one person after another coming behind and his mistake in the same way, till the conviction became general.

I believe this has not only a possibility but a frequent occurrence in the history of medicine, an instance of which has led me into the present discussion.

Malarial fever is the most unhealthy disease in our whole pathology, in regard to the treatment of which there ought to be any difference of opinion; for it is one of the very few diseases which we have it in our power to arrest in its course by the use of a certain remedy viz. Cinchona Barks; which very remedy, now, as we have been neglecting for many years the use of Mercury theatre, which is not only nearly or almost useless, but to the excessive extent it was pursued in this disease, extremely injurious. After such an example we cannot be surprised to find many other; and a careful investigation into the past history of present state of medical practice would no doubt be fruitful in the revelation of many such instances.

I proceed with the use of Barks or Quinine in Malarial fevers. Though there is now little differing of opinion at to its efficacy in the case of the various forms of this disease, still it has been administered, as regards the
time, quantity, and frequency of use, is still a disputed point. I propose therefore to consider each of these leads in detail, and in doing so, restrict only to Quinine, considering it as the representative at home before the States of Quinone. Bland, many of its alkaloids having the same therapeutic properties.

I proper time for the use of Quinine in cerebral fever.

Seeing that this is the remedy, and the only remedy, though not the certain one, on which we must rely for the arrest of the disease, and to which the use of all other means is subordinate; it is in accordance with reason that it should he used as soon as possible. By as soon as possible, I mean as soon as it can be introduced into the system of the patient, with the prospect of being of any service, and without the risk of proving injurious, or at least of the benefit derived from it not greatly counterbalancing any bad effects it might produce. Now soon then can it be introduced with the prospect of being of any service? Each practitioner must answer this question and act accordingly, in accordance with his particular notion of the mode of action of Quinine. It is obvious that the greater the intensity the fever, depending on the quantity of the poison imbued into the system, and indicated by its degree of continuousness and allied symptoms, the more difficult it is for any remedy to effect a cure, and vice versa, the less the quantity of malaria virulent and the milder the symptoms, the more easily are they affected by remedies. Therefore because the utility of Quinine is...
more rapidly, and obviously demonstrated in the milder intermittent forms of malarial fever, the paroxysms of which it speedily cuts short, than in the more violent dangerous continued forms, it has come to be regarded as an antiperiodic, whereas it is truly a febrifuge for malarial fever, perhaps, more strictly still, an antiperiodic to the malarial person; and is equally useful in the most continued forms though not so evidently so, because the quantity of fever in the blood, the effect of which it has to counteract is so much greater. Many persons overlooking this view of the subject, have fallen into the error of supposing that quinine is only useful in malarial fever, when its force has been lessen'd, or rather when it begins spontaneously below a remission or intermission of symptoms. The term antiperiodic is also apt to mislead. It implies a mixture of fact and theory. The fact has been already stated, namely that its power is exhibited in proportion to the degree of periodicity of the symptoms. The theory, in explanation of this fact also implies in the term is, that quinine has no power over the symptoms (or the disease itself), so long as they remain continuous, but that its virtue resides in antiperiodism.
to their recurrent character. This theory would appear still further supported by the fact, that the remedy, exhibited during the period of a paroxysm, did not display such a manifest power of stopping it, as to overthrow the correctness of the term, or induce practitioners blessed by its implied meaning, to use the remedy at this stage; and so many of them would remain convinced in the belief that it would be thrown away if given at this time, yet did not prove absolutely injurious. Probably the reason why quinine cannot be exhibited during a paroxysm of fever to any degree, is, that it cannot be introduced into the system in sufficient quantity to act, either from want of time or from the process of absorption being more or less in abeyance, or from both causes combined, or because each stage of a paroxysm is to a certain extent the necessary consequence of the preceding one, thus the cure stage must be followed by a certain amount of reaction, in order to restore the body to its normal temperature; and this reaction is very apt to pass beyond the limits of healthy heat, even the face of the temperature of the body being lowered by cold applied to its surface. In the same way the last stage must be followed by a great reduction of
the temperature and a return of the various parasitic
reactions, and these processes in the case of the skin
must produce some amount of sweating which is
the characteristic of the third stage. However, the prac-
titioner who regards quinine simply as an antipar-
castic will wait for a remission or intermission,
before he employs it. He on the other hand, who re-
gards it as an antipyretic, capable of neutralizing the
poison of malaria, or as a special febrifuge cap-
able of counteracting its effects, and as an antiper-
castic only in so far as it is curative of a fever
whose tendency is to assume a paroxysmal char-
acter, but equally efficacious ceteris paribus whether
that character were exhibited or not, will employ
it as soon as he recognizes the nature of the dis-
ease; not with the expectation of checking the par-
oxysm during which it is administered, but with
the view of getting it into the system as soon as pos-
sible. I think certainly, act in accordance with this
latter view, and give quinine at once. His method
saves time, and although the fever does not
lie immediately appreciable it is probably not the less
valuable. I would try it repeatedly and carefully be-
fore coming to a conclusion on the subject, making
the effect on the following paroxysm, or to make more
sure I would use it in large doses during the excurre-
tion, and omit it during the abatement of the symp-
toms, in order that there would certainly be effect on the
following paroxysm. Indeed of course by this plan at
first in mild cases, in which there would be no
danger to life from its failure. If I found that I in-
creased during a paroxysm of Intermittent, for
example, and omitted during the intermission,
had the effect of modifying or not stopping the follow-
ing paroxysm; I would try it in less and less
severe cases of Intermittent and then of Remittent
in the same manner, till the efficacy of its em-
ployment in this way was fully confirmed or modi-
fied; and in the case of the former being the result
I arrived at, I would use it in all cases, from the
very earliest period, as well as during the remsi-
dion or intermission; and would be more especi-
ally careful to do so in the most threatening cases.
It may appear presumption to propose such a plan
on the whole grounds, or to suppose that it has ever
proved fair and accepted trials from the men of
distinction and great practical experience, who have
come to the conclusion that it is inefficacious.
or harmful, but teach an extent are the minds of all men, even those who think themselves eminently practical, influenced by theory in their mode of treatment. For in many cases, this theory is so latent in their minds that its existence is not appreciated or recognized by the persons who are its objects, that the benefit of any method of cure, in accordance with or opposed to the particular theory which their minds are inadvertently biased, is least and not sought for sufficiently careful and repeated experiments; and I cannot help thinking that such is the case in the present instance. The tendency to use remedies without regard to the symptoms or exacerbations, has been generally growing more general during years, and may judge from the views of the authors at my disposal, and the importance growing that during a period of the disease as possible is now generally admitted. I will cite a few opinions on the subject beginning with those who most strongly advocate the views there adopted. I may remark that the question comes to the importance as it in the severer forms of the disease, the more imperfect, remittent, and the continuous case,
In ordinary intermitents there is no necessity for giving
Lumme at the beginning or in the height of a paroxysm:
there will be plenty of time for its exhibition through the
intermission, and no danger to this will result from
delaying it till that period. But then it is impossible
to prognosticate at the commencement of a case
what type it may assume; and therefore, it is only in
chronic cases, in which the disease has gone on for
down time, that we are justified in waiting with the view
in expectation of an apposable period. And indeed
it is equally impossible to tell, at what time the type of
the disease may change, and it may pass from the
intermittent, intermittent, and from this the continued.
It follows therefore that it is only in a small minority
of cases that the delay, in the use of Lumme till the
apposable period is justifiable, yet in the case that
the exhibition of the medicine is admissible and useful
at previous periods.

Dr Cameron in an Article on the Endemic Fever at
Edinburg's Medical and Surgical Journal for Jan. 1836
remarks. The following details and conclusions are
drawn from the experience gathered at the bedside during
nearly thirteen years service in this colony which has led
me to abandon the use of bleeding and salivation in the
Chapmannes in the form of tropical fever prevalent here, and in substitute in their stead the free use of quinine, without any regard for accidents, delusions or local complications. This practice, though very analogous to that recommended by Clark and Lind in the last century, is, however, opposed to the doctrines of the modern school; as I have generally found my newly arrived brethren exceedingly surprised by it, and afraid that the worst results would follow the use of quinine during the hot stage of fever. A single trial, however, has generally convinced them of its efficacy in this island. And, in fact, the practice may be considered almost universal in the colony, so that I am induced to submit the results for the information of the profession, in the hope of deriving the general resemblance of tropical diseases that what has been gained to great an improvement here, may upon trial prove successful in other localities.

Further on the remarks after a quotation from Copland's Dictionary of the symptoms supposed to contraindicate the use of quinine. "These were exactly my own ideas on commencing acquaintance with tropical fevers, I had in common with my brethren, a dread pinning the least risk of giving quinine as long as any local or high febrile affection was present; feeling assured that if such a mistake were committed, the result..."
Practical Remarks on the Epidemic Fever of Ceylon

J. R. Cameron M.D. Staff Surgeon of the 2nd Div. (Communicated to the Editor of the Director General of the Army Medical Department Edinburgh Med. Surg. Journal Oct 31st 1870)
would certainly be aggravated if, and not a few cases have
been lost in this way, with deep regrets that there
was ever an opportunity of giving quinine, there
being no commission. Another form of roastingidea,
and one which I believe the very general, was, that
a certain amount of antiphlogistic treatment must be
before the eruption can bear the application of
quinine to that the idea of giving it was seldom at
all entertained till the third or fourth day of fever;
and then, it was timidly ventured upon in small doses
and stopped the moment a rise in fever set in. "My general
plan now treating fever is as follows:
Sleep with a foot or two of water, and order at the same time
twenty grains of quinine, with an equal quantity of
James Powder, to be divided into eight doses, and one
given every third hour regularly. This in general
soon relieves the violent headache, pain in the bones,
and is steadily continued without any regard to exacerbations. No symptoms arise; they are met on the way
formerly indicated but on no account is the quinine
stopped if the stomach can be made to bear it, the
James Powder being omitted of necessity, and the chief
remedy given in pills or solution as may be easiest
for the patient. Instead, I made the best
The majority of cases, if early attended to will give very little trouble, and are cured at such a small expense of thought that the patient is rendered but a short time a sunshine: a point of great consequence in military medicine. And if no means unimportant it must be allowed in any practice.

I now quote from Dr. Tipp's Clinical Illustrations of the Diseases of India: 'There is no more certain fact among the results produced by medicinal agents than that of the power of this preparation of zinc oxide (Zumine) to put a stop to the whole phenomena of Parasymphatetic Fever. Each of the 1200 cases of this disease now under consideration in which this medicine was used is confirmatory of this assertion; and the impression produced on the author's mind by his whole experience is that wherever a certain quantity of zincine can be exhibited in that form as a Fever in Parasymphatetic where the disease has declined from its acute, the tendency to exacerbation will become checked and all the other phenomena of the disease will by themselves or by the use of minor remedies disappear.... It has been found in the author's experience that no time need be lost in having recourse to its aid for this purpose. The exhibition of Zumine can go...
Along with that of any remedy for attendant symptoms, and in as much as the latter may depend upon the aggravation of the febrile accesses, this medicine must be considered as an auxiliary to any remedial means. However discordant nature, which might be employed for the relief of such symptoms, the suppurative fever existing at the time, provided there was moisture on the skin and the disease showed any decline from the hyperemetic hot fit, did not interfere with the exhibition of this medicine, when the regularity of the case required its use. It has been given under these circumstances with the pulse ranging from 120 to 132, and with presence of all corresponding symptoms of fever. Three grains of Lumina were usually given at intervals of two or three hours till fever again occurred, or two intervals were passed over. In 516 cases a cure was effected by from 30 to 40 grains, in 214 " " 40 " 50 " in 132 " " 50 " 60 " in 148 " " 60 " 80 " in 50 " A larger quantity was required.

The author finds this not quite so prompt as Dr. Cameron. He remarks that he sees some slight indications of abatement of the fever, and their use, it is mo
Clinical Illustrations of the Diseases of India

by William Sudder M.D. Member of the Royal Medical Society of Philadelphia

Surgeon of the Ninth European Regiment 1846-1879
matter what the complication, but stops it again when
Jehu symptoms appear he seems to have a true yet
antiperiodic theory in his head, otherwise being so un
tempulous in his use of the remedy as to complication
he cannot probably here it not that he cot that he is
influenced by that theory continue it all through
"Some practitioners in Africa" says Dr. Bache "give
Junnelle freely in the hot stage, but this I have had
hardly any experience. "This drug must usually be
given in large and repeated doses, perhaps of course
of the novelty of the attack, but averaging from five
ten or fifteen grains three a day, one dose being
always administered during the remission just before
the commencement of the cold stage... Have given at
times with the best effects, sample or half half
and repeated them for several days. The simplest
mode of employing this medicine is in solution in
water, stirring up well before swallowing it. This
form though not quite as elegant, is less
noxious than when mixed with sulphuric acid
and can frequently be taken and retained when
the latter would be rejected. Out of the stomach
is very irritative it must be made up in the form
of pill, and it is often advisable to add a small
Preparation of morphia, which generally acts like a charm.

Because symptoms as they occur must be dealt with, but the cure of the complaint depends on the administration of the salts of bismuth and analogous remedies. For Balmé also appears to be antiperiodic, but he makes up for the lack of time during the fever, if the use of much longer doses when the opportunity occurs than the authorities before quoted.

In the year 1837 the treatment of Bengalee Remittent Fever with simple doses of bismuth repeated several times during the height of the exacerbation was advocated by Mr. Hare of the Bengal Medical Service. The subject attracted considerable attention at the time and was much discussed. I have no intention of reviewing the discussion;" writes Dr. Inchbald in a review of the arguments. The plan of treatment is opposed to the principles I have endeavoured to explain and inculcate in another place. "Although we are unable to interrupt a paroxysm of intermittent Fever when once formed, yet in Quinine we are provided with an effective means of preventing its recurrence." Therefore he argues, it is evident that the strength of medical practice in this case is confined to the period of intermission. Again: "In intermittent Fever..."
On the Remittent Fever of the East Coast of Africa.

Lening Medical Journal, March 570 886.
there are suspensions of the felicit condition, another
is an agent which, when effectively used in the tis-
ion tends to prevent the occurrence of the fever. In
this lies the strength of medical practice in remittent
fever. The very earliest intermission should be taken
advantage of and quinine be at once exhibited. The
best mode of doing this remedy is to fine it in doses
of from four to six grains, more or less frequent ac-
ording to the severity and abnormally of the case.
In the event of the quinine not having been success-
ful in preventing the paroxysm, then on its return
we are to omit the use of the quinine, and resume
it on the following day in larger doses. In years
and at seasons when the fevers are intense or the
disposition for, remittent fever frequently exhibits
a more chronic active, and this febrile abnormality
is came only by its assuming the inflammatory form,
but of the tendency to a well marked remission being
apparent, and by the febrile exacerbation, in the
worst cases, assuming an almost continued form,
for two or three consecutive days. Cases of this kind are
more difficult to treat, because they frequenlly do not
admit for several days of quinine being given in
doses sufficiently large to make any great impres-

on the disease. "Though thus conceiving that cases of
affirmative fever may occur in which unfortunately it is
not admissible to use quinine very early in the disease
still I am convinced that the more closely such
doubtful cases are watched, the more frequent the
opportunities of exhibiting quinine will be found to present themselves. "When affirmative fevers have thus
spread into the almost continuous form, they are liable
even after a time to revive a train of apoplectic phenom-
ena, and then the only mode of managing them is to
recall the principles laid down by Cullen, that
fears tend ferociously themselves, and that the indica-
tion given is best to abate the tendency to death." But
should the remission become distinct, by deep breathing
of the tongue even as the remission to the use of quinine.
the above indications abundantly prove that it precedes
over the efficacy of quinine, though through his opinion
yet is, is decidedly antiperiodic. He consequently finds
his hands tied in the cases in which alone all others
in fact in almost the only cases in which medical
intervention is of immediately vital importance.
still be put in the qualification that if careful
watching many opportunities of using the remedy
will be found, and shame no doubt that practically
Discards and India
he was in the habit of finding many such opportunities, judging from the high estimation in which he held
Jumine, and from the fact that he relies upon it alone for the cure of the disease.

I extract the following from a work on the Practice of Medicine. Speaking of the treatment of Inter-
mittent he says "The medicine should not be given during the pyrexia in ordinary cases. Here is some danger
that it may aggravate the fever and the cerebral affection, while there is almost always time suffi-
cient in the interval." Again on Perpetual Fever he remarks "There are some who advise this treatment in
all cases of bilious fever (i.e. the rise of Jumine) whether there are any obvious remissions or not. By they go so far
as to maintain that the medicine may be given without any reference to exacerbation or remission, long
as little injurious in the former as in the latter. But

though I believe there has been much of prejudice
in the demelanation of medical men to use Jumine
under any other circumstances than those of com-
pete intermission, a prejudice probably arises
from the unpleasant effect of the powders last,
when given during the existence of fever, yet
I am not prepared to renounce the old opinions
As to the tense and excentric properties of this medicine and concert but thnt th at it may do much harm
if administered under circumstances of high arterial
excitation, especially when attended with inflammatory
tendencies of the brain? Again he remarks, 'Then a par
oxym of great violence has occurred from which
the patient has escaped been saved only by the most
 strenuous exertions, and this is every reason why
that a similar one will prove fatal, because should
he had the sulphate of guinia, in the emission how
ever short or imperfect it may be. When the fever
has hitherwise shown little or no tendency to remit, and the
grade of violence is such that fatal results appear
imminent, thanks the highbrow emission show it-
self, and the symptoms not the those of cerebral in-
flammation or strong determination, the Guinia shou}
be found in without stint. He more nearly a case ap-
proaches to the above extremer, the stronger is the indi-
ation for the use of the antipernicous medicine. Sam
entirely confident, that I have been bies caused by this
remedies, that must have been inextant lost under
any other. The quantity of Guinia given in the emission
must be sufficient lasting the eopon under the influence
of the medicine, before the period for the next paroxym.
In the treatment of the Pernicious or congestive form of this disease it is not without danger to devote a separate chapter of treatment to the Pernicous form, the same Author remarks, of damage may be advantageous employed, even in the Jarrow or before treatment. It is indicated for its evident influence upon the nervous system, and is all important in reference to the rest of damage. Again "As soon as a remission or intermission has been obtained, there but one course of treatment, and that is all important. There should be no delay for previous treatment, no waiting for a more perfect relief from this, that or the other symptom. Such delaying has been but too often fatal. As matter whether the patient has been under treatment during the Jarrow or not, as matter how partial the remission, yet be a remission, no matter at what period of the internal the practitioner has been called; his first, his last, almost his only thought should be sulphate of Junia. This is the remedy for the disease and only this. From thirty to sixty grains of this salt should be given from the commencement of one Jarrow, or that of the next. If none has been given or retained during the Jarrow, the whole shall be administered in the remission or intermission from the disease must be repeated. From two grains at this the amount necessary for the
whole internal may be given alone. Having that in
from the administration of this remedy. Even a simple volatile
Gastrin is no sufficient counteractation. If the Gumia
be ejected alone, it should be combined with opium or mor-
phine, until ejected. It should neverthel least administered
in the hope that a portion at least may be retained; and
because it should be kept troentemate, and to the external
application. If administered by injection, it should be mixed
with laudanum or morphia, and with a little acie as

to dissolve the sulphate, and should be given in double or
triple the quantity that ought to appear, if the mouth
is applied externally, a large blistered surface should be
made over the epigastrium, and the rest applied very
much diluted, in order to prevent inflammation and con-
sequent interference with absorption. It has been proposed
to inject it into the veins, but it is in only otherwise inap-
cer cases that this method of administration would be practicable
in the present state of our knowledge, and I have the re-
ports to care must be taken that the car be thoroughly
discharged. In a post note he adds "The question may be asked
why, if Gumia is thus commended in the violent cases
as the most efficient remedy, it should not also be employed
in the milder, in which it seems to have with more
effectual, I am not disposed to deny that many mild
Cases would yield to the remedy employed even in the early stages, and without reference to remission or exacerbation. Indeed I cannot refuse credence to the many statements of this effect which have proceeded from highly respectable sources. But even though it may often prove useful, it sometimes results from giving of not determining some inflammatory affection, especially in the brain, upon which it has a most powerful effect. Such a case may very properly be incurred in cases of great danger from other causes; though it might be proper to mention it in milder cases, which may almost always be carried to a favourable issue without it.

The above quotations from this best authority sufficiently show that, though in ordinary cases it acts demine on the antiparodic principle, and still entitlesagogue to its injurious effect on local determinations especially to the brain; it virtually appears there in the cases in which the question is of any vital importance, namely those in which danger to life is threatened. The more quotations on this subject I can add, from a paper by Dr. Mischon. The beneficial effect of guinée without cases (now enlarged doses at the very commencement of a disease) confirm, in some measure, the extraordinary
Results of Mr. Bave, Surgeon in the Bengal Medical Service and which at one time excited considerable sensation among the Medical Profession in India. The principal feature in Mr. Bave's treatment of remittent fever, consisted in the administration of large doses of quinine, from one to two drachms daily. The more severe the fever, the more frequently was the simple dose administered, till complete cyanosis was produced. He waited for no remission before giving the quinine, not regarding the medicine as an antiperiodic "Tears" he says "destroy the flat accumulation of blood, in the veins of the brain and abdominal orifices, and quinine has the power of stopping these accumulations." But of this be the action of quinine we might expect it to be equally serviceable in the treatment of many of the continued fevers of the country; but in these we have ourselves seen it fail in patients and especially in cases in which Bennett's case in "Clinical Journal" (1852, Vol. I, p. 130) he believes that it is only in those fevers which are intermittent or remittent, that quinine is of any service. And therefore to say that it acts as an antiperiodic would be fanciful to its true action as well as our present knowledge admits—an opinion, of course, which is confirmed by the fact that quinine is also of service in various acute periodic complaints.
Medical notes on the climate of Barmah. Sc.
J. Charles Menkeson M.D. Sc.
I have not been able to consult for these papers in the Indian Annals of Medical Science, but from the references that I have quoted, I should be inclined to follow him in the view that quinine is not merely an antiperiodic, though I cannot at the same time say that his explanation of it is entirely satisfactory. As far as he considers, that if it is not an antiperiodic, it ought to cure the contagious continued as well as the malanal genus, seeing that their causes or morbid agents are totally different. Dr. Christiano states in his Dispensatory in treating of Cinchona: "Its antifebrile properties are limited to those genera which present the character of periodicity, but this account and likewise because it also arrests other periodic diseases, such as neuralgia, Cinchona ought rather to be designated an antiperiodic than a febrifuge; the latter of which terms may tend to perpetuate erroneous theoretical as well as practical errors." Page 335.

I think it must be admitted from the quotations I have made that the term antiperiodic is not free from objection on the same grounds. I find from my copies of Dr Christison's lectures on materia medica in 1833 that I understand him to have said that the
term antiperiodic applied to Cinchona Bark and its preparations merely expresses the fact that they cure periodic diseases but the fact of course in the least explains their mode of action, whilst all that could be said was that it depended upon their effects upon the nervous system, as evidenced by cerebral congestion.

From such a statement, clearly no misunderstanding could arise, but I cannot help thinking that in many people's minds the term is mixed up with the term antiperiodic which influences their intellect.

Mr. Briquet has made an elaborate series of investigations on the physiological and therapeutic action of quinine. I quote the following summary of his conclusions from his Jones Lectures on Cinchona Bark and its preparations. He considers that it does not act directly on the malarial poison. It does not act on the general state of the organs or on the liver but it has a special action on the nervous system. It does not act by increasing the vital forces. It acts by a true action or an exciting action, or a stimulant action, but by a sedative stuporific action. All other remedies for intermittents show the same sedative action, thus Sydenham cured them by opium. Arsenic also he thought acts on the nervous system depressing the action of the heart, stopping the production
greatest and the functions of life. In small doses it may stimulate in large doses atropine. The first action when
acetorphine is stimulating, the full face rises. Acetorphine
causes neuralgia at its cure, aimed by subduing the action
of the nerves, not by any toxic action. Opium acts more
on the brain than on the organs of the nervous system.
Opium lessens the pain and eases,愈益prostrates,
and destroys. This is its specific action. It is a palliative
remedy, another acting on the cause of the morbid
structure generally, but as opium cures delirium tremens

In my opinion the deduction drawn by
Mr. Bright from the physiological action of gummine in large
doses as to its special therapeutic mode of action in
intermittent fever, namely that of prostrating, stopping
sedative, is totally inconceivable with its immediate
therapeutic value in other varieties of malignant fever.
Now, y such were its action could it be used without
certain destruction to the patient's blood in the most
forms of intermittent fever, which are characterized as
atonic, perennial, congestive; in which the powerfully
sedative action of the medicinal poison has already set
high force & fatal the system. How is it possible
the addition of another prostrating, stopping agent to
that already inspiration could be  poor in these cases.  
Such a result would evidently be a powerful homeopathic  
argument. If such be the manner operative of quinine the  
disciples of Hahnemann may well cry. Similia similibus  
curantur.

I answer this question on which I have already alluded  
too much, though it is by far the most important one  
a practical point giving that I have had to touch upon.  
It is clear that the conclusion at which I have arrived  
will be wrong on the safe side if error if le-theras  
All actions as to periodicity and the necessity of  
aphasia, and throw away all complex acts local complications  
and vascular reaction, in the case of quinine in the  
most virulent and dangerous forms of malarial fever.  
but that there may be need with safety the attention  
in cases where time is a little moment. The discrimi- 
nation of the one act fever from the other will  
require much practical capacity on the part of the practicioner.  
In order judgment it must be entirely left for no  
particular rules can be laid down on the subject.
If in doubt in any case I should say, let the patient  
have the benefit of the use of quinine.  
I must say a few words before bringing on the conclusion  
with the quantity and frequency of the dose of quinine.
It appears to me that this is one sense a most important
and in another a comparatively unimportant question,
it's moment depending on the character of the cases, like
that of the question as to what period of the disease the remedy
should be given. In the first place it is necessary to determine
what is the total quantity required on an average to
affect the system as to arrest a paroxysm of the fever.
This will obviously vary according to the intensity of the case
deal crops from Jo xii to xxiv in Intermittents, from
Jo xiii to xxiv in Paroxysms, and with Remissions
cases in time, from 3d to 6d. In nearly a half of
let the cases a cure was effected by from Jo xxx to 2d
Dr. Christian states that the average quantity required in
the dosis is from Jo xxxvi to 2d. Say for example
that 3d would be sufficient in twenty-four hours, should
this quantity be given in eight doses, or in three, or all
at once. This would be a question of great importance
only in dangerous cases, and then it would be entering a
question of time and reason. Those who hold that the
remission is the right proper time to give the remedy
ought, if they expect to the short or if they were not
quite sure that it would be longer than three hours to
give it all at once. Suppose for illustration that the time
long enough to repeat the dose several times which in
In all cases they cannot almost never be, to give the whole
at once or nearly so. Even those who hold that the exhibition
guainine is not inadmissible at other periods, knowing
that it is more readily absorbed through a vesication and
probably efficacious in smaller quantity at this period,
would here the opportunity afforded of giving it at this
stage at first, make the best use of it, if exhibiting the
medicine in large doses also. Again the holders of the
latter view are so strongly imbued with the value of
guainine, that, in any case in which that impression
would lead them before that at other periods, they would
give it in a large dose as feasible also, to as to afford
the system as soon as feasible.

On the other hand in regular intermissions the type
of which is already known, its intermission can be
calculated and the medicine regulated accordingly, it may
be a question and one of perhaps not much moment
whether the quantity of medicine which it is believed will
be sufficient to arrest the next paroxysm should be
given in one large or several small doses. We would
imagine that the method most in accordance with the
antiperiodic view of the action of guainine, would be
to give one large dose just at each a time before
the expected occurrence of the paroxysm as that its
Influence would be most fully exerted just at that period. Those on the other hand, who consider that the remedy had more or less direct power in destroying the aetiology or its products in the system, would most consistently give it in a larger dose and as soon as possible. Neither of these methods has changed; they have been generally adopted. The usual system has been, and still is, to give small doses frequently, for example from two to six grains every two to four hours. He who prefers giving small doses frequently because the medicine is more readily absorbed this way and is less irritating to the stomach. To what extent also also advocates small doses as being the most economical plan, a large quantity of the medicine being sufficient. For example, gives doses of from four to six at intervals of two hours, the third dose falling about the expected time of the paroxysm; or as before the medicine in full operation at this period. Locke usually gave three grain dose, sometimes five or six grains at a time. Within the last few years the use of intermittent fever in India has come or half-grain doses has been advocated by Dr. C. Mackinnon, Fletcher, and P. Murray. Their conclusion is that one such dose is generally sufficient to treat the following paroxysm, and that it is most efficacious when given
in the sweating stage. They all agree in the opinion that such a mode of treatment is never followed by any unpleasant symptoms, neither beyond ordinary emaciation. The advantages said to be gained are: 1. Increased efficacy; 2. Economy; 3. Few demand on the attention of hospital attendants. This question is only discussed by Mr. Bircham in the paper I have previously referred to. He states that he was induced to try the effect of large doses from a statement by Dr. Chrichton in a clinical lecture in March 1832, in which he said, "It is better to give a large dose at once, such as thirty-two grains, which has been shown to be the average required in India." He found that it was that he gained in the treatment of 92 cases of one temperature that in the sweating stage, the average quantity required to check the paroxysms was only 23 $\frac{3}{4}$ grains, while in 16 cases treated by repeated small doses the average quantity required for the same purpose was almost double, or 43 $\frac{3}{4}$ grains. "For the success of this treatment it is necessary," Dr. Bircham says, "that the large dose be given during the third stage and as near its commencement as possible. It is far from being so effectual, when given during the intermissions between two paroxysms, or a few hours before the expected commencement of a paroxysm as is recommended by some writers."
always gave instructions that the quinine should be given as soon as the patient began to perspire freely after the hot stage." Some inclined to place great confidence in the above results obtained by Jenner, and knowing the a very trustworthy observer. They are just such as on theoretical grounds I would be prepared to accept in accordance with the view that quinine has a special action upon malaria or its products in the system. It is reasonable to suppose, that the remedy given at the very beginning of the third stage of fever would come into operation against the malaria, just at the period when it can act upon it with most advantage; namely, when the poison was at its lowest ebb within the system—in consequence having been largely eliminated after the violent commotion of parasyn of the reacting excretory organs in its last stage—and was just again beginning to renew its strength by undergoing another period of incubation. I went certainly therefore adopt this plan in relation to intermittents, and would follow out the same principle in remittent cases the earlier the earlier the previous parasyn the shorter the remission was likely to be, and pump it in greatest quantity at least, as to be as nearly as possible in action at this period. Simplicity
Uninterrupted and continuous forms on the other hand, in which the action never seems to attain the mastery over the poison so as to expel more of it, the victim has not the advantage of its assistance in this way, and has thus to deal with the adversary single handed. In such cases it would be dangerous to wait for any signs of victory on the part of the system, in order to put in the quinine, merely to assist in giving the malaria the boot; we must trust to the medicine alone, and therefore probably the sooner it is given the better, as the poison may be growing or developing itself all the time, and becoming more and more invisible.

As to the mode of administration of quinine, the chief point is in what form it is most rapidly absorbed. Mr. Bright finds that in the form of pill it is in three hours only one eighth as active as when given in solution, and in five hours four fifths as active.

For example he states that thirty grains given in pills will not appear in the urine for six to eleven hours while four and a half grains in solution may be detected in from three to four hours. Fifteen grains used as an enema appear in the urine in twelve hours. (Med. Times & Gazette.) These results show a most important difference in the capacity of absorption in the
from solution from that of pill, which should be realized when rapid induction of the influence of the medicine is necessary. On the other hand it was stated, "It is quite consequent whether the given in solid or in solution. The pill is generally disassociated with the utmost facility in the stomach in consequence of the presence of muriatic acid there. It should, however, be freely malleable when it is desirable to have act promptly." Someone he adds farther on "Besides, whilst it is of great importance that it have act promptly, another may possibly be no action with stomach, we may perhaps rely with more certainty on the solution than the pill." Its exhibition by enema should always be combined in cases of urgency, especially of those be irritability of stomach; and that if the enema method should be kept in view though it is agree that is apt to produce troublesome inflammation.

Other alkaloids of Cinchona Bark are nearly if not quite as efficacious as Quinine. Amorphous Quinine, or Quinine is when four equally efficacious; so in Cinchoine in doses one third larger, and quinidine almost the same proportion.

Quinine may be added to the wine of a solution of Saline in solution of Atropium as first proposed by Boucharand. Mr. Bignon uses as a test solution...
two grains of ginger, and eight grains of digestive opium, to two hundred and fifty grains of water. The physiologist may thus be detected in 1343 grains of water. Dr. Bucquet finds that of less than eight grains of ferrire are taken in 1828 grains of water, it will appear in the urine in from half an hour to two hours. The quantity precipitated will be in proportion to the quantity taken, and the elimination of the urine quickly ceases. Even after large doses have been taken for several days, it cannot be detected more than thirty hours after the stopping of the medicine, most commonly not after more than after twenty-four hours have elapsed.

It appears from these observations that the elimination of ginger is so rapid, that one might expect its action upon the system to be very fleeting.

Its cessation of elimination by the urine usually after twenty-four hours has taken as an indication that it has disappeared from the system by that time; how can a humble gift given at the very beginning of the third stage of a tertian ague, prevent the accession of the following symptom due about thirty hours after; as it has been found to do in the majority of cases of a manchian malarial. It certainly cannot be any cures antiparasitic mode of action, for it has disappeared from the system of the very time that it
ought to be in full force to meet the jauneym, he can
only explain it by supposing that it has already acted
as an antidote to the malaria or its products in the blood,
or has repaired the injury done by total or part of
the system it acts upon, and renders that part proof
against its further effects.
It does not necessarily follow however that because
quinine has ceased to appear in the urine, that it has
disappeared from the system. It has probably formed in
soluble combination. At least its effects remain for long
after. Mr. Biquet himself states that its effects last many
days after the medicine is omitted.

Some other vegetable tinctures resemble cinchona and its allies
in their antipernicious properties. Of these, quinine is the
most important, the introduction of which is due to
Douglas Mac-Lagan of Edinburgh. It is probably not much in
favour because of its irritant qualities. Mr. Baillie states that he has found
it a very good remedy for a half or a third of the cases of
quinine, and curing the effect of headache and
sitting in the ears. Chireta also is very efficacious.
W. Mitchell gives a decided grip of alone, quite ef-
s. He has cured a number of intermittent in the nature of Quinine,
in most cases. Hadlum, Stevens, informed this fact
of an experienced Medical Officer of the Bombay Army.
before I saw Thomson's statement confirming it. Artemie, also enjoy a high reputation. It is said to sometimes effectual in chronic and obstinate cases in which quinine fails. Many other substances have been proposed but none of them of much importance.

Shed intended to devote sometime to the consideration of the induction of the mercurial influence as a specific for malaria fever, but time fails me, and I conclude that as its reputation in the cure of this disease is generally trying a very natural death, further discussion of its merits only serve letting it into increased notoriety. I agree fully with the following sentiments of Dr. Baillie: "The rule the invariably observed in using mercury, except perhaps now and then as a cathartic, if fever has slain its thousands, this unfortunate drug has slain its tens of thousands, and no rational argument can be advanced in its favour. Then a patient is struggling hard against the effects gone for, his chances of recovery must be naturally diminished, upon that and equally deadly poison is poured into his system. The mercurial treatment was one of the first examples of irrational suppression, directed to forcibly at first from an erroneous induction and continued empty of the force of imitation."
There are still however a few who have confined in
Mercury as a remedy. It would not, in the least, in my
Practice of medicine on the treatment of Remittent Fever,
Mercury has enjoyed a high and merits reputation in this
disease. It has been frequently observed, that few patients,
the of bilious fever whose symptoms have been brought
under the influence of this remedy. The ugly nature has be-
now made to this argument in its favour, that those cases
only are susceptible to the action of Mercury which can
be cured by other means, or want to get well spontaneously.
But this is obviously an assumption, not the statement
true. Diseases which run their course on a few days,
it is sometimes impossible to affect the mouth, but
these are by no means the only dangerous cases
nor indeed the majority of them. In most cases, the
disease advances to the ninth day or beyond the
fourth or fifth. Other cases there are very few,
in which the mercurial influence cannot be stated
acted; and the inference is in that were proper attempts
made to establish it, very few would end fatally.
In this extract is contained a statement of the whole
question, a fact from which two parties draw any
different inference. I think, that whenever there is
great difference of opinion as to the efficacy of any
comedy or made of treatment via particular case, the conclusion may very generally be safely drawn that they are of little or no use. Physicians are not in general apt to underrated the power of remedies; on the contrary they almost always give them credit for too much.

Opium. Have assigned this place for this remedy not because it can be said to be a radical one, but because it is of too much value to be elaps among the ordinary palliatives. It is not now used much for the purpose of stopping a fever, though it sometimes has this effect by its full hypnotic action in acute Internments, and when it does not stop it moderates the jet and makes this way gradually cure the disease. Quinine has superseded its use in this way. But it is of great value when judiciously used in this or in all other fevers, in which Wattpayns helpfulness, lasting of the bowels and other irritations are of common occurrence. Its exhibition must be guided by the other symptoms concomitant with those to which it is especially directed, especially with a recollection of the comatose tendency which is apt to intervene suddenly in Talarial fevers because the end of a fever, which it might tend to appear
Treatment of the Eclampsia of Malarial Fever.

The malarial cachexia, with its enlarged spleen, anaemia, and constant fever, are not effectively treated unless the patient remains exposed to the cause of the whole evil. Clearly therefore change of air is the most important indication, and that change to a non-malarious country or district: this is sometimes absolutely necessary to preserve life as in the tropics.

Scleraemia with its attendant hypertrophy of the spleen are both most effectively treated by Chalybeates, combined with irregular foliculae tendency should remain with grain. St. Barthelemy states that he constantly uses preparations of iron during convalescence from malarial fever to limit the extent and duration of the enlargement of the spleen which is their almost invariable accompaniment, and perhaps prevent it altogether. For this purpose the extract of gramine and iron is a useful preparation.

He states that he finds no remedy so effective in the treatment of enlarged spleen as the capsule of drapery, which he says "murns immediately, that spleen gives then the sweetest and brightest cuius calli."
3. Treatment prophylactic against malignant fever.

Lime is probably fully as much value as a pro-
phylactic against malignant fever as it is in its treat-
ment when formed. In one sense it is more value, for if
we can rein a man against an attack of the dis-
ease, we do more to save his life than can be done
in the use of any remedy however efficacious, after
it is formed. This was first recommended thoroughly
at this in his treatise on the "Precautions for the Safe Greening" and has been introduced into the British Army with great
success. Great the following observations on this point
from Dr. D. B. Barrie, whose experience in the Niger expedi-
tion in 1857 enables him preeminently to judge, and whose
services on that occasion have been recognized by the
Government of this country who have given him the com-
mand of another expedition to the same region.

For the employment of lime as a prophylactic we are
many indebted to the exertions of Dr. Brydon R.N., who
also recommends that its use should be continued for
a period of fourteen days after leaving such places,
or during the average extent of the term of incubation.
Attention to this has largely increased both the mobility
and the extent of the African Expedition to such an
extent as fully to justify our belief in this property.
gummine. While up the Kowa or Tiper in 1832, she met ample opportunities for testing this virtue, and must undoubtedly have spread belief in its existence. While in the Delta and in swampy districts, it was regularly administered and its use continued for about a footnight afterwards; and among twelve Europeans hardly any sickness occurred, during a stay of four months, in what has hitherto been considered a most unhealthy district. I have taken the first thing in the morning to the extent of three or four grains, and occasionally it was repeated in the afternoon. The only troublesome effect which I have observed from the continued administration of gummine is a tendency to a thin abstinence constitution, but this can easily be guarded against by the occasional use of a mild laxative, such as a bread powder. It has been suggested that the constant repeated use of gummine in this manner might probably gradually wean to its good effects, or render the recipient more able to resist action. But such was not my experience; it seemed she just as active and just as fast as at the last as at the first.

It was this prophylactic power of gummine another argument in favour of its action being something more than antiperiodic, or rather something different.
Here we may say it causes a disease—fo that the
malarial poison has entered the blood as mother case—
which has never been developed into a definite paralysis
and therefore can have exhibited no periodicity. Small
cases also in which it is found effective, have
four grains daily, occasionally once repeated, appear
to favour the idea that it destroys the poison as it
enters the blood, and prevents its accumulating so as to
tar the system.

Raphylactic diet and regimen are not to be enlarged on.
They obvious flow from a knowledge of the etiological
causes of the disease already discussed.

Raphylaxis is the choice method for dwelling, camping
in malarious districts is of the utmost importance, and
will depend upon a correct knowledge of the topographi-
cal distribution of malaria, in accordance with the
laws regulating its development, positions which have
more fully described in a former portion of this essay.

Such a knowledge must be invaluable to a medical
man in the tropics, especially in the public services and
a judicious application of it must in no small degree
increase his practical usefulness in promoting his ad-
ancement in his profession.
I am fully aware that, in concluding this essay, an apology to the professional reader, in whose hands it may fall for perusal, is demanded of me, for the unpolished shape in which it is submitted to attention. I should have liked besides enlarging a good deal more upon certain points, and introducing others that I have omitted, than revised and rewritten a great part of what has been committed to paper, in which case both the composition and the writing might have been more elegant. I confess, that being engaged with other matters, I procrastinated too long in the first place, and in the next place wasted so much time in collecting preliminary materials on too extensive a scale, and to confound a shape; that at least I found time beginning to fail me, and was obliged to hurry over the execution of the matter. I trust, however, that the many imperfections which will be observed in it will in some measure be compensated for by the appreciation of the desire on the part of the writer to study and treat the disease in an enlightened manner, and in the first place to arrive at a correct knowledge of its true nature and causes, and in the second place while paying due deference to the opinions of
Others, always at the same time preserve the right of independent observation and judgment, and act accordingly; being fully aware that this is the only thing which can save our profession from the discredit entailed on practice which have not added to its reputation or utility.

George Suckville Sutherland

13 Pitt Street
Edinburgh
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