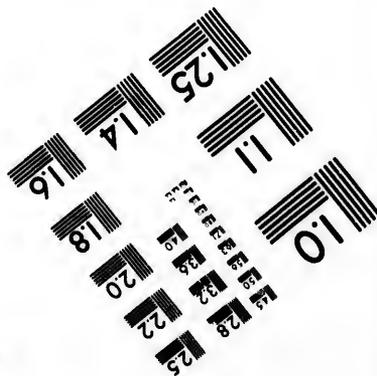
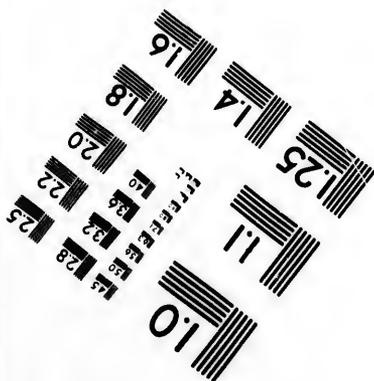
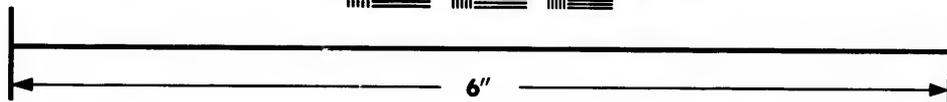
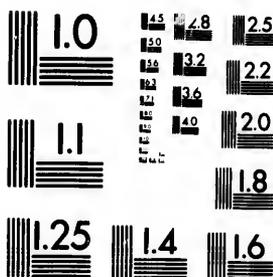


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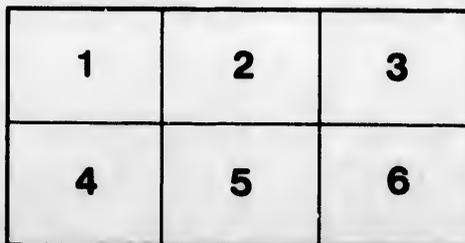
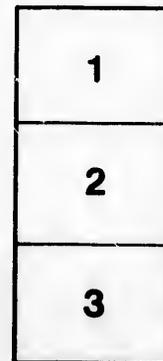
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PAPER

PREPARED TO BE READ AT THE

ANNUAL MEETING

—OF THE—

Canada Medical Association,

HELD AT BANFF,

TUESDAY AND WEDNESDAY, AUGUST 13 & 14TH. 1889.

BY A. JUKES, M.D.,

Vice-President for the Northwest Territories for 1889.

BUT NOT READ ON THAT OCCASION.

SUPPLEMENT TO THE "NORTHERN LANCET," JANUARY, 1890.



WINNIPEG :

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Prefatory Note.

THE following paper on "The Endemic Fever of the Northwest Territories" was prepared by me as Vice-President of the "Canada Medical Association" for the Territories referred to, to be read at the Annual Meeting of the Association, held at Banff, on the 12th and 13th of August, 1889. My name and paper appearing first, both on the list published in the "Canada Lancet" and on the Programme shown me on the first day of the meeting at Banff.

Perhaps through some misunderstanding, but *certainly* without my knowledge until late on the last day of the meeting, when it became known to me accidentally, my name and paper were transferred from the top to the bottom of the list, on discovering which, I withdraw them.

A. JUKES.

REGINA, Dec. 30, 1889.

PAPER

PREPARED TO BE READ AT THE

ANNUAL MEETING

—OF THE—

CANADA MEDICAL ASSOCIATION

Held at Banff, August 13 and 14, 1889,

*By A. JUKES, M.D., Vice-President for the Northwest Territories
for 1889.*

But not read on that occasion.

Mr. President and Gentlemen :—

As Vice-President of the Canadian Medical Association for the Northwest Territories, and more especially for that portion of them comprising the three great Districts of Assiniboia, Alberta and Saskatchewan, extensive and widely separated regions which I have visited on many occasions, and in some of which I have for various periods resided during the last seven years and more : I have thought it might interest some of those present, to whom much relating to these Territories may be comparatively unknown, to hear from one who has enjoyed greater opportunities for acquiring such knowledge, what he has learned respecting,—

1st. The Indigenous diseases to which the aborigines were subject in their natural primitive condition.

2nd. The Contagious Zymotic diseases from which they have suffered so disastrously at the hands of their invaders ; and third, The Endemic diseases, with which we who have entered into and taken possession of their inheritance, have now, and will hereafter, increasingly have to contend.

During the years referred to, I have as many of you probably know, occupied the position of Senior Surgeon of the N. W. M. Police, a force numbering 1,000 men, detachments of which, many of them large, are now and have been for many years, stationed in almost every part of the Territories lying south of the Great Saskatchewan, and latterly to some extent, in the Province of British Columbia also; that is roughly speaking, over an expanse of country extending from Banff, where we now stand, somewhere in the neighborhood of the 116th Meridian of West longitude, to the Western boundary of Manitoba, upwards of 700 miles to the Eastward ; and from Fort Saskatchewan on the great Northern river of that name, in about 54 degrees of North latitude, to the International Boundary

line, covering nearly five degrees of latitude and fifteen of longitude, and embracing an area of not less than 220,000 square miles.

With much of the widely extended and diversified territory here referred to I am personally familiar, my duties having led me on various occasions over the greater part of it; and monthly Sick Reports being regularly received by me, at Head Quarters, from Assistant Surgeons attached to the several Divisions, containing detailed statements of all diseases occurring among the men under their care, during the periods referred to; and as no member of the Force has for several years been invalidated for any disqualification, until he has first appeared before me for final examination, in order that his medical history, his present condition, and all the circumstances relating to the origin and nature of the disease for which his discharge is recommended, may be clearly understood and recorded; my opportunities for acquiring trustworthy information on the subjects to which I propose to direct your attention, have probably not been inferior to those hitherto enjoyed by any other physician in the Territories.

I trust I shall not be misunderstood;—I mention these circumstances, not from any childish desire to magnify my humble office; but because, to the majority of the members present, I must necessarily be a stranger, and the subject to which I propose more especially to direct the attention of the profession, in view of the probably rapid and extensive colonization in the near future, of these broad and fertile domains, is one, the significance of which cannot be overestimated, and which deserves, and must sooner or later receive the consideration its importance merits.

So far as we possess accurate knowledge, which is really very considerable when sought for, the aboriginal inhabitants of these and the adjoining Territories, previous to the invasion of Europeans, other than the old trappers and traders who first dwelt among them for the purposes of barter, and ultimately became assimilated with them; enjoyed as complete an exemption from contagious Zymotic diseases, as did both the natives and colonists of Australia and New Zealand prior to the introduction of steam navigation; all those from which they have since so pitilessly and calamitously suffered, having been entailed upon them by white men; but with one exception to be hereafter referred to more particularly, have not hitherto become permanently domiciled here.

In their aboriginal condition, before they became debauched by the vices and contaminated by the diseases of their conquerors, like other indigenous races whose progenitors had succeeded by a species of natural selection or adaptability of constitution in surviving the assaults of malaria under conditions which must long have proved fatal to many, the majority of the males fell in battle before they reached an advanced age; they were subject to comparatively few diseases, apart from those dependent upon wounds and injuries; and these were for the most part the result of great exposure and long abstinence from food, in their war expeditions or

unsuccessful hunts during severe weather, or were due to intemperate indulgence, when abundance supervened upon long involuntary fasting ; and consisted chiefly in rheumatism, bronchitis, and affections of the mucous membranes generally, more especially those of the digestive organs, and occasionally fevers, attended sometimes by diarrhœa and dysentery ; all of which were probably of a malarious origin. They were familiar with the noxious influences abounding in the neighborhood of marshes and shrunken beds of rivers, more especially in the autumn, from which they occasionally suffered, but in a comparatively trifling degree, having like other indigenous races become acclimated by long habit and exposure, to conditions which exert an often fatal influence on strangers.

During the summer of 1882 when our Head Quarters Post was still at old Fort Walsh, in the Cypress Hills, situated on the margin of the Battle River, a small stream winding through the flat alluvial "bottom" of a great valley, several hundred feet below the summits of the surrounding hills ; the low ground in its immediate proximity being then covered with a luxuriant growth of small timber and underwood ; the Southern Crees, who at that time had not taken the treaty, came down during the autumn in a state of great poverty and destitution ; the buffalo, hitherto the unfailing source of food supply of the plain Indians, having suddenly disappeared ; and encamped in the underwood along the bottom of the valley to the number of 7,000, within a radius of a mile from the post, in a state of semi-starvation ; yet, strange to say, though our own men, well housed and fed, suffered severely from endemic malarial fever ; only one case occurred among the Indians, whom I visited at all hours of the night and day, and that was in a child of six or seven years, and was probably less due to disease than to destitution.

In their aboriginal condition, their camping grounds were selected not only in the most picturesque and inviting spots available, in the neighborhood of water, but always, if on rivers or lakes upon the westward or windward banks, and as much as possible in the vicinity of such belts of timber as are commonly found near them ; not only for the sake of fuel and shade ; but from a clear recognition of their comparative salubrity. All the contagious Zymotic diseases, without exception, to which they have since been exposed, and which have wrought such awful devastation among them, have been a part only of the heritage of suffering and wrong entailed upon them by the race to which we belong.

Their marvelous recoveries from wounds and injuries ; often extremely severe ; which among civilized communities in ordinary climates would inevitably prove fatal, were, and still are due, to the phenomenally pure and antiseptic air, abounding everywhere throughout these elevated plains, where nature alone, with the observance of ordinary cleanliness, (in which in his natural, unperverted condition, the Indian of these Territories was by no means deficient), affords resources all-sufficient to accomplish rapid

recoveries, even after wounds of the most appalling nature. These remarks though still substantially true, apply more directly to a period antecedent to their complete suppression and degradation, by what with grim irony goes by the name of "Civilization." At present as a race, too many of them, more especially the feeble remnant, not exceeding 7,000 in number, of the once proud and powerful tribes of the Blackfeet, Bloods and Peigans, now known as the Blackfoot Confederacy, established along portions of the "Old Man's, the "Bow" and the "Belly" rivers, from one to two hundred miles southeastward of where we are now assembled; have long been so debauched and degraded by intercourse with Europeans, wherever in the course of their wanderings they have been brought into close relations with them; and so universally contaminated with syphilitic disease in every conceivable form, manifesting itself as I have too often noticed throughout entire families, in scrofulous affections, clearly complicated with, if not wholly dependent upon hereditary Syphilis; that it is now difficult if not impossible to find any among them altogether free from such constitutional pollution and defilement.

In their normal condition, living a wandering life in the open air, the boundless sky above them, the boundless plains below, they enjoyed a remarkable exemption from acute idiopathic inflammatory affections of the parenchymatous structures and serous membranes, which we who have supplanted them in their ancient homes, still continue to enjoy. During upwards of nearly eight years spent in active professional work in various parts of these Territories, exercising medical supervision over a large number of comparatively unacclimated men, whose duties often subjected them to more than ordinary exposure; I have never during that period, seen a single case of Idiopathic Pneumonia, Pleuritis, or Peritonitis; though owing to causes hereafter to be referred to, painful neuralgic affections, too often mistaken by the careless and inexperienced for these graver forms of disease, are not uncommon.

In looking back recently over the Monthly Sick Reports for several years past, I find only one case of Pneumonia recorded; and this solitary case occurred in a division stationed in the Kootenay Valley in British Columbia, 120 miles south of this hotel, ("Banff,") during December, 1887.

It is true that we now find among the Indians in their present degraded and dependent condition; and more especially during youth and adolescence, chronic pulmonary affections in some respects resembling Phthisis; but the ultimate conviction impressed upon my mind has hitherto been, that these are but the too common manifestations of a pseudo-scrofulous form of disease, originating in the fatal and universal contamination of their progenitors, to which I have already referred. I have in my possession records written by men of great intelligence, going back 125 years and more, who from personal intercourse with the primitive races of these plains, were familiar with their true condition, before they became

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contaminated with the diseases of civilization ; who, while recording the few maladies to which in their natural condition they were obnoxious, are either silent respecting those to which I now refer, or state distinctly, that in their uncorrupted condition they were absolutely unknown.

In view of the facts already indicated, and were nothing further to be related, the climate of the Northwest Territories might be justly regarded as occupying a very high, if not the highest place, among the purest and most salubrious of which we have any authentic record ; but we must not shut our eyes to the fact, that over vast areas of them, the limits of which are not yet clearly defined, Malarial Fever, often of a very severe and dangerous type, at certain seasons and under certain conditions favorable to its development, almost universally prevails, and must, as the country becomes more extensively colonized by unacclimated European immigrants, and larger areas of unbroken prairie are turned up by the plow, continue for many years increasingly to prevail ; the centres of activity or foci of which, during each particular season, will be determined greatly by the amount of annual rainfall, and the long continuance or the reverse, during the summer and autumn months, of very high ranges of temperature, which latter are the rule rather than the exception here during July, August and September, even in very high latitudes.

The subject on which I am now speaking is one with which many here present, more especially those whose professional experience has been acquired in the southwestern districts of Ontario, or further south in the states or territories of the neighboring Republic, must already be familiar ; but probably like myself, on first arriving in these remote and highly elevated northern regions (more especially as the type here differs materially from that occurring in southwestern Ontario) ; you are hardly prepared at first sight to recognize or even suspect the presence of this veiled and venerable but undesirable acquaintance, in latitudes far north of those to which its presence, (at least to any appreciable or dangerous extent) has long been restricted by the best authorities.

In a recent number of the *19th Century*, it is stated on the authority of Mr. William North, that no Malaria or such only as is insignificant in its character and effects, is found upon the continent of North America above the 50th parallel of north latitude. This is a grave mistake ; the limits of Malaria cannot be accurately defined by purely Geographical latitudinal lines ; they are modified often, it is true, to a very remarkable extent, both by these and the *Topography* of the region in which it may be found ; but to a much greater degree by its *Geological* formation, and by the direction, that is, the amount of *Northings*, assumed by the isothermal lines, which varies so remarkably in different longitudes upon this continent.

So far as Mr. William North's statement has reference to the Provinces of Ontario and Quebec, it is sufficiently accurate ; but its truth, even here, depends far less on Geographical than on purely Geological conditions ;

why this is so, may not at first be apparent ; it certainly is *not* because the mean Summer temperature, in many parts of Eastern Canada, is not sufficiently high to mature the germs of Malaria did they exist ; nor that the cold of Winter, infinitely inferior in degree to that common on the North Saskatchewan, and far south of that line destroys the germ, or forbids its development—not this at all—the immunity is probably due to the circumstance, that soil formed by the disintegration of archæan or primitive formations, which constitute the special Geological features of lower Canada, does not provide either the necessary matrix or pabulum, required for the generation and development of the germ of Malaria ; as not only there but wherever these primitive crystalline formations constitute the distinctive Geological characteristics of a country, malarial disease will be extremely rare, if not altogether unknown.

Throughout the Northwest Territories, including nearly the whole Province of Manitoba, and the extensive districts of Assiniboia and Saskatchewan ; a very large part of Alberta ; by far the greater portion of Athabasca, and still further north-westward, the conditions here referred to are altogether wanting ; almost the whole of these broad expanses being of *cretaceous* and later tertiary formation, overlaid with more recent aqueous deposits, and over immense tracts of these widely expanded regions, under favorable climatic conditions ; more especially under the very high ranges of temperature at certain seasons prevailing ; Malaria will be extensively generated, as indeed, experience has taught me it is. I will endeavor to explain why :

If we examine any good map of North America, upon which the isothermal lines, first indicated by Baron Von Humboldt, are laid down, we shall find that as they approach the eastern slope of the Rocky Mountains, and at immense distances from their base, they acquire a rapidly increasing and very remarkable degree of *Northing* ; until in the northern parts of Assiniboia and the western half of Saskatchewan, they gradually assume a direction and follow a course considerably north of Northwest ; and ultimately nearly due north, carrying with them over these remote regions beyond the northern limits of Athabasca, and throughout the broad and fertile valleys of the Athabasca and Peace rivers to their embouchure upon the Great Slave Lake, the very high ranges of Summer temperature commonly prevailing in Southern Manitoba and Assiniboia. The significance of these important facts will more readily become apparent when it is understood, that the mean summer temperature at the Great Slave Lake in 62 degrees of north latitude, is precisely similar to that at Qu'Appelle and Medicine Hat in Southern Assiniboia, nearly twelve degrees, that is 800 miles to the south of it ; but along the North Saskatchewan river and notably at Battleford, the mean Summer temperature is five and a half degrees higher, and over the whole of this broad expanse, Malaria under favorable conditions will be largely generated.

It might reasonably be conjectured that on reaching the elevation attained by the rolling prairie at the foot of the eastern slope of the Rocky Mountains, (some 4,000 feet) we might with a light heart, bid our hitherto omnipresent enemy good-bye, and that still further westward, on threading their dark and deep defiles, we should once more breathe freely, under the strong conviction that here at last, we were safely beyond its influence; but it is only too true, as all past and present experience proves, that in many of the gloomy gorges and deep, humid valleys of these mountains, a severe and fatal form of malarial remittent, commonly known throughout these regions as "Mountain Fever," prevails more or less extensively in Autumn, when high ranges of temperature have long continued, resembling very closely that occurring upon the plains. This may be accounted for by the fact that very large areas on both flanks of these mountains, extending very far within them, and constituting in British America, between the 49th and 55th parallels of north latitude, four fifths of the whole mountain range are composed, almost exclusively, of carboniferous limestone and Devonian strata, embracing in their depressions considerable areas of the same tertiary and cretaceous formations, which, as already shown, constitute so wide a surface of the great plains lying to the eastward of them and which have apparently been lifted up by these mountains in their ascent, and when in addition to this it is pointed out that the bottoms of these mountain chasms are filled to a great depth with vast accumulations of decayed vegetation and calcareous debris, washed down during unnumbered centuries from the surrounding mountain sides, it will no longer seem strange to those who are capable of appreciating the significance of these facts, that under such conditions, unacclimated miners and others temporarily inhabiting these valleys during the Autumn months, when great fluctuations of temperature occur during every 24 hours, should not unfrequently suffer from Malarial Fever of a very severe and fatal character. We lost several men of the Division temporarily stationed in the Kootenay Valley, about 100 miles south of this place, (Banff,) from a fatal hæmorrhagic form of this endemic fever in the Autumn of 1887, and might probably have lost our Assistant Surgeon, also but for the prompt and efficient services rendered by Dr. Powell, Superintendent of Indian Affairs in British Columbia at that critical period.

The whole subject of Malaria, and indeed the greater subject of the "germ" origin of disease, of which this is but a part; though considerable accessions to our knowledge have recently been achieved, is one which is still, to a great extent, shrouded in impenetrable mystery. Laveran, it is true, has recently confirmed, by his discovery of a specific microbe, or Amœboid parasite, in the blood of patients suffering from Malarial Fever, what to some had long been a foregone conclusion; but the primal source or "germ-mother" which gave birth to this Amœboid parasite, or to the

germ-cell out of which it was developed ; and whether *this* was primarily of animal or vegetable origin, still remains a profound mystery. My own conviction is and has long been, that all life, animal, vegetable, and perhaps even mineral, is originally one and indivisible. and that each of these kingdoms, from the lowest to the highest, in turn provides, or constitutes, the matrix in which all germ-life is generated, and from which, by methods at present incomprehensible, it is in turn *progressively* developed : in other words, that all life has a common primordial source, and is originally one and indivisible ; like the mythical life-tree Igdrasil of our Norse ancestors, having its sources deep down in the realms of Hela, its top-most boughs touching Heaven ; but ever green and growing, being watered by the three Nornas, times or eras, the Past, the Present, and the Future, from the sacred life sustaining well of knowledge, by which alone all true vitality grows and is developed.

Twenty-five years ago or more, when the "Fermentation theory" of contagious diseases, from which we derive our term "Zymotic," so ingeniously taught and illustrated by the late Sir Thomas Watson in his unique and classical "Practice of Medicine," was still universally accepted, I suggested a proposition, for which I received unmeasured ridicule at the hands of my medical friends and contemporaries, (of which the few survivors I still occasionally meet, remind me, with tardy appreciation and recognition) namely that all idiopathic fevers would ultimately be traced to a germ origin ; those of a contagious nature being probably due to germs of animal life, reproducible in the system and therefore transferable or contagious ; and those of a non-contagious nature, such as malarial fevers, to germs of vegetable life ; not reproducible in the system and therefore non-contagious. I possessed neither the means nor the opportunity in those days ; being engaged in a large general practice ; for verifying this suggestion, which longer experience tended to strengthen and confirm ; the much later discovery and announcement of the "germ" theory of disease, since so increasingly demonstrated by microscopical investigation, was therefore no surprise to me, as it had long been a foregone conclusion ; nor was I aware, until quite recently, that, in the century preceding the Christian Era, upwards of 2000 years ago, Lucretius had suggested that "Malarial Fever was due to the presence of living organisms in the blood."

I have long ceased to say much about such dreams, having no opportunities for verifying them, and knowing the penalty I must suffer from dreamless sleepers for thus disturbing their repose ; but I will mention one which has frequently, during the last few years, presented itself to my mind, and which, like that of the germ origin of fevers, may some day be demonstrated, namely ; that a more intimate acquaintance with the sources of diseases and their irregular manifestations under rare, ill defined, but still unquestionable conditions ; has led me in later years to believe and sug-

gest, that all life everywhere, both vegetable and animal, *was* and *is* in its lowest form and earliest manifestation, *one and indivisible*, and that under certain obscure and inexplicable conditions not yet definable; though for a long time more than suspected; and quite conceivable by me, the germs in which non-contagious, incommunicable, endemic malarial diseases appear to originate; may, under conditions of intense spiritual excitement and exacerbation, acquire from our higher life a higher development, more closely allied to the lowest forms of animal life, so almost impossible to distinguish from them in their earliest manifestations; and under such conditions, convert a *hitherto endemic non-contagious disease*, such as Asiatic Cholera long originally *was*, into a contagious epidemic; which, abandoning its local endemic birth place in the reeking, sweltering, pestilential river valleys of Hindostan, to which it was long confined; acquires under such conditions a higher development, and spreads itself by direct contagion from man to man, over every region of the habitable globe.

I entertain a very strong suspicion, almost amounting to absolute belief, that all contagious diseases now known; more especially the great epidemics of the middle and earlier ages, some of which have apparently died out and disappeared; originated in *progressive germs*, conceived *in*, and developed *from*, some foul endemic source, under such abnormally excited or depressed spiritual conditions of humanity, as then too frequently prevailed; but which under the greater liberty and enlightenment of mankind, won by advancing science and all-conquering light, we hope may never reappear.

The discovery and demonstration of Laveran's Microbe as the true source of all malarious fevers, is a revelation, but one for which we have long been confidently looking, and of whose ultimate manifestation we have long felt morally certain; but so far as any true knowledge of this parasite is concerned, we are as yet only crossing the threshold of the door, the fuller opening of which may yet unveil the mystery. We have much yet to learn respecting the life history of this Amœboid parasite; and indeed of the true origin of all germ life. Is it of animal or vegetable origin? or do these nominal distinctions ultimately resolve themselves into successive links of the same life-chain having one common paternity? Why does this microbe, (if always one and the same) behave so differently under changed external conditions, and produce such variously modified results upon different soils and under different temperatures? If *not* always the same, how do the physical characteristics of a soil so greatly modify its effects? We know that the gravity of the fever, due to the presence of this microbe, *is qualified greatly by the solar heat under which it is incubated*, and the soil in which it is bred or developed; but why the presence of certain chemical or mineral ingredients in its birth place, and the degree of heat under which it is generated should make all the difference between an ordinary intermittent and a malignant remittent; (provided the parasite is always one and the same), is not yet explained. The soil of the Dismal Swamp

in Southern Virginia and North Carolina, and of peat marshes everywhere, no matter under what temperature they are found ; is as fatal to it as that formed by the disintegration of Laurentian rock ; though both these soils are largely comingled with decayed vegetable matter. If peat moss is fatal to the incubation of the *germ* of malarial diseases, may it not contain a principle equally fatal to the Amœboid parasite *after its development in the human body* ? I think this suggestion not unworthy of consideration.

The ubiquitous Endemic Fever of these Territories, often of a very formidable character, *is unquestionably of Malarial origin*, and can only be successfully treated under a clear recognition and acceptance of this fact ; why, in the St. Clair flats and other marshy districts of south-western Ontario, it (Malaria) should produce most commonly a simple intermittent ; and here, where the Summer temperature is little different, a severe and formidable remittent ; supposing the microbe in both instances to be one and the same ; or why its malignancy should be so greatly increased, (as it unquestionably is,) by the presence of certain *mineral or chemical ingredients* in the soil from which it originates, are questions not yet satisfactorily answered ; but the facts are capable of being demonstrated. Among others, may be mentioned the accessibility of its habitat to sea or saline water ; as in the Tuscan (Maremma,) or in the bayous, tidal marshes, and embouchures of rivers, in tropical and semi-tropical regions subjected to tidal influences. The presence of sulphur or sulphurets in the volcanic soil of Italy and various others similarly constituted ; * of salts of iron in the ferruginous soils of the West Coast of Africa, of Hong Kong and Arracan, to which Sir Ranald Martin long since attributed their intense insalubrity, to which may now unquestionably be added the material commonly known throughout these North-West Territories as *Alkali*, which abounds so almost universally over enormous tracts of very various country here ; saturating not only the soil, but the waters of large landlocked lakes, and of all ponds and marshes having no outlet, over thousands of square miles of territory, and consisting mainly of salts of potash and soda, probably originating in the ashes of burnt forests and prairie grasses, which, during thousands of years, have grown up and been consumed by fire over these illimitable plains ; to the presence alone of which saline ingredients in the soil. I have long attributed the extreme severity and too often fatal character, of the Malarial Endemic Fever, of this otherwise salubrious north-western land. But it must always be remembered, that in regions where Malaria at certain seasons is largely generated, there is no single condition which tends so greatly and unmistakably to intensify its malefic influence as the continued prevalence during the summer and autumn months of very high ranges of diurnal temperature.

* Mr. Wm. North observes : "The volcanic nature of the Italian peninsula, generally, may be taken into the list of causes which contribute to its insalubrity."

We have few other independent diseases here; malaria, like other despotic powers, tolerating no rival in its own imperial domains, wherein it practically reigns supreme; impressing its own marked characteristics upon, and materially modifying, every other form of disease intruding temporarily within the limits of its empire, and compelling *all*, so long as they remain, in the words of Sydenham, to "*wear its livery.*"

In concluding this paper, I had not originally intended to offer any suggestions respecting the method of treatment which I have found most successful in the management of the Endemic Fever to which I have referred as occurring so universally throughout the northwest plains, during seasons favorable to its development, from the North Saskatchewan to the International Boundary Line, and from the valleys of the Rocky Mountains to Winnipeg, and probably far beyond these limits, more especially along the courses of the great river valleys, in autumn, after preternaturally hot and dry summers, when vast expanses of muddy flats are laid bare and exposed to the scorching sun of July, August and September; but since completing this paper as originally written, I have been induced by the advice of others to add a few words on this matter. Let it be first clearly understood that under various local appellations conferred upon it in the diverse regions over which it prevails, whether as "mountain fever" in the valleys of the Rockies; as "Saskatchewan fever" along the great rivers of that name; as "Red River fever" throughout that portion of Manitoba watered by the "Red River of the North"; or as "Typhoid fever," too common in Winnipeg at the present day, which has unquestionably a similar origin (though modified to some extent by local influences abounding more or less in all great and growing cities); the true source and governing influence of the wide-spread and fatal disease, hitherto generally referred to under these diverse appellations, is in all cases one and the same; having everywhere a common origin, though occasionally modified by conditions locally prevailing, and requiring for its successful management and treatment a clear recognition of this important fact.

The general course of treatment to which I now propose to refer did not originate with me, nor indeed in these Territories at all; it is a modification of the treatment found most successful and ultimately adopted by the medical officers of the Army of the Potomac in the swamps of the Chickahominy, during the great American Rebellion of 1863; long before the true Germ-origin of Malarial Fever was known, or even suspected, save by a few; and which has since been found equally applicable to, and successful in the treatment, under all climates, of cases of fever clearly traceable to a malarious origin; the true rationale of which has now been rendered clear, by recent revelations respecting the physiological action of quinine and its salts upon the microbe to whose presence malarial fever is due, their specific action as *direct Germicides*, confirming in the most

emphatic manner our confidence in their efficacy in the treatment of malarious diseases.

This fever, throughout the whole Northwest, so far as observed by me, is rarely a pure intermittent, but always of a severe remittent type; the nearest approach to an intermission occurring ordinarily during the first twenty-four hours, after which, if unattended or unscientifically treated, the fever frequently assumes a severe remittent character, which may well be mistaken for a continued fever, unless the clinical thermometer is assiduously and intelligently used and the temperature regularly recorded, when distinct remissions, occurring most frequently between five and eight in the morning, will be apparent; but if mismanaged, it will pass in the course of a few days into continued fever, often of a low typhoid type,* over which medicine exercises little appreciable control; the special symptoms characterising which, whether of an Asthenic, Hæmorrhagic or Comatose character, will vary much in different years.

During the first fourteen or twenty-one days, wherein alone we can hope successfully to limit its duration, the same uniform treatment will be generally applicable, and will, if faithfully and intelligently carried out and persisted in, prove efficient in the vast majority of cases. I have seen a good deal of malarial fever during the last forty years, and for the last eight have been familiar with it as it manifests itself in these Territories; during this latter period I have never lost a case which I attended personally from the beginning of the disease, and very few, where the course of treatment suggested by me was adopted and intelligently persisted in by others, even after ten days had elapsed since its inception.

The first and most important step in the management of this fever, is to ascertain *at what period in each twenty-four hours the temperature touches its lowest point*; that is, at what hour we may hereafter expect the remission to occur. *This*, in five out of six cases, will be between five and eight o'clock a.m. A temperature chart should be immediately prepared, and the temperature during the first twenty-four hours should be carefully taken every two hours and recorded thereon; and, *when it is falling*, should be taken *every half hour*, and recorded, until the exact time in each twenty-four hours when it touches the lowest point is registered.

As regards internal treatment, if the case is seen early, I sometimes begin by giving a scruple of ipecacuanha as an emetic, and as soon as this has ceased to operate I give one drachm of compound tincture of cinchona with ten minims of dilute nitric acid in sufficient water, no matter how high the temperature may be, and continue this every three or four hours, day and night, according to the severity of the case, giving at the same

* Due unquestionably, as has been clearly demonstrated by Tommasi, to "*Necrobiosis* of the red corpuscles of the blood," literally death of the life-blood by the destructive agency of the parasite. This amoeboid parasite has since been clearly demonstrated by Laveran and others.

time as nourishment equal parts of milk and water in such quantities as the patient will take it, and water or toast water ad libitum, to allay thirst. If the tongue becomes brown and dry, I paint it frequently with glycerine, laid on with a large camel hair pencil. In the majority of cases seen early, if this treatment is persistently and intelligently carried out, an intermission will occur (*generally* between five and eight a.m.), within the first seven days, when ten grains of quinine should be *instantly* administered (as it may last but half an hour), and repeated at the end of an hour if the temperature has not increased. Several ten-grain powders of quinine should be left with the nurse or other competent attendant, with definite instructions, when and under what conditions, they are to be administered; unless (which is far better) the physician can be with the patient at the time the intermission is expected. The opportunities afforded will not be many, and if these are lost, the patient may go on for five or six weeks, to a tedious recovery, or death. Should the temperature rise above 99 degrees after the first ten grains of quinine are administered, the cinchona mixture must be continued every three hours as before, until the temperature again touches 99 degrees or below. Whenever that may happen, ten grains more quinine must be promptly administered, and the same course continued until an intermission of twenty-four hours has been established, after which the cinchona mixture must be continued every four, five, or six hours, with the addition of from two to six grains of quinine to each dose, according as the interval between them is longer or shorter, until convalescence is fairly established, when the periods for administering this medicine may be reduced to three times a day, and gradually discontinued. The slightest over-feeding for *many days*, may bring on a dangerous and sometimes fatal relapse.

Complications may require separate treatment. In dysenteric diarrhoea, which is most common, I use large cold water injections containing a drachm (more or less according to the quantity injected) of muriated tincture of iron. Cold water alone, carefully administered, and retained by the pressure of the hand until tolerance is established, is of great service.

Should anodynes be required in order to quiet restlessness or promote sleep, I have found from ten to twenty grains of lupuline preferable to preparations of opium. Whoever will give this treatment a fair trial in any of the "Malarial" or so-called "Typhoid Fevers" occurring in these Territories, will never afterwards be disposed to adopt any other. Typhoid symptoms always supervene if the fever is permitted to continue beyond the 14th, or at most the 21st day; but they are due to the progressive destruction of the red corpuscles of the blood by the microbe, and this will be arrested by the destruction of the parasite, if the measures suggested are fairly adopted, Laveran having recently demonstrated beyond question that

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cinchona and its salts, more especially quinine, act when absorbed, in malarial disease, as direct germicides.

I have not found the administration of alcoholic liquors (so largely resorted to by many), advisable during this fever; from what I have seen as the result of its two indiscriminate use by others, I believe it greatly complicates and intensifies the symptoms, and increases the danger to life. After the fever has been completely interrupted, the moderate administration of stimulants with the food has apparently tended to hasten convalescence.

A. JUKES, M.B., &c.,

Senior Surgeon, N. W. M. P.

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