

REVIEW III.

1. *Die Geographischen Verhältnisse der Krankheiten oder Grundzüge der Noso-geographie.* Vols. I. and II. Von Dr. A. MÜHRY.—Leipzig and Heidelberg, 1856. 8vo, pp. 508.

The Geographical Relations of Disease; or, Outlines of Noso-geography.
By Dr. A. MÜHRY.

2. *On the Geographical Distribution of Health and Disease.* The Article introductory to Plate 35 of, and at p. 117 of, 'The Physical Atlas of Natural Phenomena.' By ALEXANDER KEITH JOHNSTON, F.R.S.E., F.R.G.S., &c., Geographer at Edinburgh in Ordinary to Her Majesty. A New and Enlarged Edition.—Edinburgh and London, 1856.

A CERTAIN concurrence of injurious conditions is requisite for the production of disease in mankind, individually or collectively. In our endeavours to analyse these, we meet with difficulties in discriminating which of the morbid agents, under some given concurrence of circumstances, may be singled out as the one specially productive of the diseased result. Extended sickness and mortality among military masses may be caused by peculiar predisposition, by dietetic errors, bad water, want of cleanliness or suitable clothing, defective ventilation in the sleeping berths, mental depression, and over-fatigue in marching or in the duty of the trenches. But all such causes of disease are greatly aggravated by the conditions of the soil and drainage of particular countries, climatic degrees of temperature, atmospheric humidity or density of the air, associated with the course of the seasons in various localities, and the different degrees of latitude and longitude. Malarious, intermittent, and remittent fevers, yellow fever, typhus, plague, dysentery, diarrhoea, and cholera, have a certain natural geographical order and distribution, depending on temperature and moisture, with other concurrent agencies of diet and topographical position. The facts of physical geography and of vital statistics, then, applied to investigate the laws which regulate the distribution of health and disease among the human family, constitute a new and most interesting branch of medical etiology, under the head of Medical or Noso-geography. This promising field of research, which may be said to be yet in its infancy, must be ever of interest and utility to all those destined to sojourn in foreign climates, or in our remote colonies; or who may be entrusted with the command of soldiers or sailors in these countries, or with the preservation of their health. It was truly said of old by Hippocrates, that the constitutions of men change with the seasons; but to which he might have added, *more particularly with climate and geographical position.* Just in proportion as the physiological conditions of plants and animals vary according to different degrees of latitude, or, speaking more specifically, with the different lines of equal temperature and moisture north and south of the Equator, so must the pathological character of disease differ. On this subject, Humboldt first developed the theory of botanical geography, or the

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nature of the more material causes which geographically regulate not only the distribution but the acclimatation of plants. Blumenbach subsequently generalized the physiological facts connected with the various races of man and animals in different quarters of the globe; proving that certain types of form and varieties of the species owe their geographical distribution to certain concurrent physical agencies, which regulate the diversities of animal and vegetable structure.

The distinguished authors of the two works at the head of this article are those more particularly deserving of notice on the subject of medical geography. Following the examples of Humboldt and Blumenbach in other departments of natural science, they have brought the ascertained facts of the meteorology and climatology of our globe to explain the geographical limits of particular diseases, and their regulated distribution, according to atmospheric temperature and moisture, the density and electricity of the air. While these meteorological causes determine the laws by which certain diseases are geographically distributed, the concurrent causes of topographical situation, geological nature and elevation of the soil, state of the vegetation, and habits of the people, stamp a special character on the diseases of certain countries. Dr. Mühry, in classifying diseases, arranges them under the head of zymotic and of dyscrasial disease—a distinction of some importance, as indicating diseases mainly under the influence of meteorological causes, and those that prevail independent of such influence. Just in proportion as we become capable of knowing that particular diseases are limited to certain portions of the earth, and can trace the meteorological laws of their geographical distribution and diffusion, we necessarily obtain clearer conceptions of the causation of disease, as well as more practical knowledge of the means of prevention and cure, by certain climatic changes and topographical conditions. So extensive and useful is this subject of medical geography and climatology, that it may be made applicable to the acclimatation of masses and individuals in various countries; the topographical position and construction of habitations, military barracks and hospitals; as well as the diet, clothing, and military exercises of troops. In the works of neither of the authors quoted have the principles of medical geography been yet made applicable to those varied subjects of practical hygiene.

Dr. Mühry's work is divided into two parts,—the first explains the principles of *medical geography*, or diseases in their relation to geographico-meteorological causes; and the second is devoted to the *climatology* of various quarters and districts of the globe. The principles are divided into ten chapters, embracing various considerations on the nature and origin of diseases, which may be conveniently reduced to the following summary:—First, the general condition of natural diseases; second, first lines of climatology, or the geographico-meteorological relations of diseases; third, the geographico-geological relation of diseases; fourth, classification and terminology of diseases; fifth, system of the geographical distribution of diseases on the earth; sixth, the nature of miasms, malarious fever, yellow fever, and cholera indica, considered geographically; seventh, the contagious diseases, particularly plague and typhus, considered geographically;

eighth, of the absence of typhus in the tropical zone, and from the entire southern portion of the earth; ninth, the geographical relations of influenza, ophthalmia, dysentery, and scrofula; tenth, results from these investigations for epidemiology and hygiene.

The work of Dr. Mühry is a worthy offering of philosophy and science to Alexander von Humboldt, to whom it is dedicated. Though less purely geographical and statistical than the article on the same subject by Mr. Keith Johnston, it is highly creditable to the medical acquirements and reputation of the author; still we cannot give unqualified assent to some of the arbitrary classifications and doctrines he has endeavoured to establish in regard to diseases which, as Mr. Keith Johnston remarks, present the greatest unity in their pathology, notwithstanding the utmost diversity of climate, soil, and other causes from whence they originate. In any system of classification that might distinguish diseases which are in a great measure independent of atmospheric agencies, and those mainly dependent on temperature and humidity, with other terrestrial and atmospheric agencies, Dr. Mühry seems perfectly aware how difficult it is to draw a line of distinction, when he says:

"If we would at large survey the aggregate of diseases, their constant, quiescent, natural distribution, and also their never-resting fluctuations, depending on the intercourse of mankind, on change of seasons, on meteorological agencies, vegetation, and spreading epidemic influences, it is then important to seek in their conditions a right and clear classification of the existing types, and to adhere to this. Such classification must certainly be quite simple. In this endeavour, it is useful to remember the natural law already mentioned, that, in spite of all variations that have in the course of time taken place, diseases have nevertheless continued, and still remain, of their primitive type—namely, that no specific new creations have produced any alteration of their primitive state. This view of the subject is quite in accordance with the facts of botany and physics; for when some new forms of epidemic disease appeared among plants, the former declared that oidium is not a newly-created species of fungus, but a new epidemic extension of an old one to the vine."

Notwithstanding the difficulty that here presents itself, Dr. Mühry in his fourth chapter attempts the classification and terminology of diseases. He divides them into specific, dyscrasial, and localized diseases, or those affecting particular anatomical tissues and organs. Under the head of Specific Diseases are arranged the zymotic, miasmatic, and contagious diseases; while dyscrasie are made to embrace all the diseases of depraved nutrition and constitutional origin. The imperfections of this classification become more apparent when, in the next chapter, the author comes to consider the system of their geographical distribution on the earth, distinguishing them according as they are *independent* and *dependent* of temperature and moisture. In this chapter he considers the geographical order of diseases, and arranges them as—1. *Ubiquitous diseases* prevailing everywhere, and not geographically limited by equal lines of temperature and moisture; 2. Diseases geographically distributed into zones, and limited by isothermal lines; 3. Particular endemic diseases; 4. Diseases unknown to certain areas of the earth. Under the head of Ubiquitous Diseases he includes both those of the specific and dyscrasial class,

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separating the febrile exanthemata and erysipelas from the gouty, rheumatic, scorbutic, and herpetic inflammations. Such a classification is arbitrary, and opposed to the facts of pathology. It is true, indeed, that erysipelas is not limited by isothermal lines to either the tropical or temperate zones, but the statistical ratio of its prevalence in the former is much smaller than in the other; and while it follows as a result of cold atmospheric humidity, it is not less a dyscrasial disease than gout, rheumatism, or herpes: an opinion of humoral pathology that dates back as far as Hippocrates and Galen.

Neither are other dyscrasial or constitutional diseases of depraved nutrition—as cachectic ulcers, rheumatism, scurvy, and consumption— independent of temperature and atmospheric humidity, whether we regard their organ or their ratio of geographical distribution. The great error of the statistical researches instituted to determine the causation of disease among the soldiers of the British army is, that atmospheric agencies more particularly, we might say exclusively, have been dealt with in the calculations. Hence the extreme deductions of unmodified and partly erroneous opinion, that consumption and rheumatism, in their origin, are quite independent of these agencies. Doubtless they are mainly, but not altogether so. Regarding consumption, Mr. Keith Johnston observes—

“It originates in all latitudes—from the equator, where the mean temperature is 80°, with slight variations, to the higher portion of the temperate zone, where the mean temperature is 40°, with sudden and violent changes. The opinion long entertained, that it is peculiar to cold and humid climates, is founded on error. Far from this being the case, the tables of mortality of the army and navy of this and other countries, as well as those of the civil population, warrant the conclusion that consumption is more prevalent in tropical than in temperate countries. Consumption is rare in the Arctic regions, in Siberia, Iceland, the Faroe Islands, the Orkneys, Shetlands, and Hebrides. And in confirmation of the opinion that it decreases with the decrease of temperature, Fuchs shows, from extensive data, that in Northern Europe it is most prevalent at the level of the sea, and that it decreases with increase of elevation to a certain point. At Marseilles, on the seaboard, the mortality from this cause is twenty-five per cent.; at Oldenburg, eighty feet above the sea, it is thirty per cent.; at Hamburg, forty-eight feet above the sea, it is twenty-three per cent.; while at Eschwege, four hundred and ninety-six feet above the sea, it is only twelve per cent.; and at Brotherton, eighteen hundred feet above the sea, 0·9 per cent. It is calculated that in the temperate zone, within which nearly all the civilized inhabitants of the globe are located, at least one-tenth of the population die of this malady. It is uniformly more fatal in cities than in the country. In England, the excess in cities is equal to twenty-five per cent. The greatest mortality occurs from the age of fifteen to thirty.” (p. 121.)

Respecting consumption in the United States climate, Dr. Forry has also established, by numerical facts, that the number of consumptive cases which originate in summer are not less than those of winter; and that the frequency of the disease in the United States army, located in the warmer, moister, and more uniform climate of East Florida (as in our own army in Jamaica and the West Indies), is greater than in the more inclement northern regions of America or Canada. By the statistical reports of the British army, it appears that the proportion of attacks in Jamaica and the West Indies is 12·5 per 1000,

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but in Canada and the United Kingdom only 6.5. In the southern divisions of the American climate, the Lower Mississippi and East Florida, the average proportion attacked is nearly 10.5 per 1000; while in the most inclement regions of the north, the average is little more than 5.0 per 1000.

Dr. Mühry's Fifth Chapter, On Miasmatic and other Diseases, mainly Influenced by Temperature, and on the System of their Geographical Distribution, is an admirable exposition of facts on the subject of zonic diseases. They consist chiefly of miasmatic diseases, and those of a self-generated contagious type, requiring a certain fixed amount of temperature for maintenance and prevalence,—as remittents, yellow fever, plague, genuine typhus, and cholera. Their geographical distribution into zones, north and south of the Equator, would appear in a great measure regulated, in America, Africa, and Europe, by relative degrees of temperature and humidity in the several places where they prevail. Their causation, however, is not solely or exclusively atmospheric, whether we view the causation of diseased action either in its relation to the temperature and humidity of the air, or to its relatively daily and annual states of density and electricity. Diseases bounded by isothermal lines are associated no less with locality and the vegetation produced by atmospheric causes of heat and humidity, than they follow the physiological action of food and habits, of the several animal organisms in different latitudes. Malarious fevers, yellow fever, plague, and typhus, have, like plants, particular climates or zones where each thrives best, and beyond the limits of which the disease is never produced, unless change of seasons gives rise to a state of climate analogous to that which is due to the latitude and position of particular localities.

When we review the history of the circumstances present at the seasons of the year, and in those countries where *intermittent* and *remittent* fevers become prevalent, it appears more than probable that a diminution of atmospheric oxygen and an augmented temperature, in those marshy situations where they appear, are the remote causes of the paroxysmal susceptibility generated in the nervous and circulating systems of the living body. If the febrile paroxysms are distinctly observable, they terminate in less than twenty-four hours; and when fevers are of more than one day's duration, they consist of repeated paroxysms, subject to the same diurnal periodicity of increase and diminution, indicated by the frequency of the pulse and the temperature of the skin. The symptoms of remittent fevers suffer diminution or remission during the lessened temperature of night or morning, and experience exacerbation during the sun's ascension, and the extreme heat after noon. The strength and frequency of the pulse varies throughout the day, and rises in proportion to the heat of the atmosphere. During the exacerbations, it may rise to 140° in the minute, and falls to 110° or 118° with the remission. Continued high temperature has a tendency to convert intermittent forms of fever into remittent, while cold or diminished temperature changes the latter type to the remittent. The following extract from Mr. Keith Johnston's remarks on the influence of topographical situation and degrees of

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temperature in producing intermittent fever, is well worthy of attention :—

“From its occurring constantly within the tropics, but ceasing far south of the polar circle, it appears that a high temperature is a condition necessary to its production, but this can only be considered as an exciting cause. It is found that a summer temperature of 60° is necessary to the production of the fever, and that it will not prevail as an epidemic where the temperature is below 65°. It therefore occurs in winter at places where the season has a mean temperature of 60° or upwards, as at Vera Cruz, Tampico, Havana, &c.; but at New Orleans, and generally under the thirtieth 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—March to November; at St. Louis, five months—May to September; at Montreal, four, and Quebec, three months. A continuance of more than two months of a heat equal to 60° is necessary to its development; hence it prevails more in October than April, though their mean temperatures are nearly the same, and its greatest prevalence in every latitude is generally some weeks after the hottest months of the year. It is rarely directly fatal, but frequently results in liver disease and dropsy. The western area of the disease is limited in America on the east by the range of the Appalachian Mountains, into the very gorges of which it ascends, by the valleys which penetrate their flanks: while that of the seaboard extends inland to the eastern base of the same range. South of lat. 33°, where this barrier terminates, its eastern limit is the Atlantic Ocean. On the south-west its boundaries are the Cordilleras of Mexico and the southern Rocky Mountains. It is almost unknown three hundred miles beyond the western boundary of the States of Missouri and Iowa, and above lat. 37° north. On the north it ceases to prevail as an epidemic at lat. 44°, and it does not occur even sporadically at lat. 47°. In Western Europe, its limits include Scotland, and on the Continent it extends to the mouth of the Angermann River, at 62° 40', in Sweden. Farther eastward it sinks to a lower latitude, and in Central Asia it appears not to extend beyond lat. 55° or 57° north, forming a curve nearly coinciding with the isotherm of 41°. To the south of this, from lat. 54° to 40°, at the level of the sea, on the coasts and river banks, it constitutes one of the most prevalent diseases. On the shores of the North Sea it causes a mortality of one in twenty, and even one in fourteen. On the northern boundary it appears only in its more simple form during summer and autumn. Between lat. 55° and 40° it occurs usually in spring as tertian, and in autumn as quartan ague. It is prevalent on the Lido shores and in the islands of the Gulf of Venice, but does not enter the city. It is periodical at Rome. Elevation above the level of the sea has a very marked influence on the occurrence of intermittent fever; thus while it ravages the *tierra caliente* of Mexico, near the level of the sea, it is almost unknown in and around the city of Mexico, 7450 feet above that level, although both places are in the same latitude. The inhabitants of the Appalachian Mountains, at an elevation of about 3000 feet, are almost exempt, while those who inhabit the valleys, under the same parallels, are affected. Farther north, at an elevation of 1500 feet, at the sources of the Alleghany and Genesee rivers, the disease is almost unknown, while on the low shores of Lake Ontario, directly north, it is prevalent. In lat. 41° it is prevalent at 900 feet above the level of the sea. It also prevails at lat. 41° 30' north, at 1100 feet in elevation, all along the rivers and ponds in the Cuyahoga Basin. The constantly increasing elevation of the desert to the west of the Mississippi, and the increasing dryness of the plains, are probably the chief causes of the disappearance of the fever, under the same parallels in which it prevails on the banks of that river. In Europe, in lat. 52° north, at Cassel, it rises little more than 400 feet above the sea. One degree farther south it occurs every year at an elevation of 600

or 700 feet, near Berka on the Werra; but at 900 feet it comes only once in ten years in isolated cases. In lat. 47° , at Grätz, 1200 feet above the sea, it is endemic; it is sometimes epidemic at Stanz in Switzerland, 1700 feet high; and it is prevalent on the plateau of Castile, 2300 feet high. In Peru, ague is observed at an elevation of 10,000 or 12,000 feet above the sea; and according to Tschudi, it occurs there in dry and barren regions. In Iceland, no native is attacked by ague, and strangers suffering from it soon recover. It is unknown in Tasmania." (Johnston, p. 120.)

The isothermal lines, first employed by Humboldt to measure the heat and cold of the earth, and to connect places having the same mean temperature, differ sensibly from the lines of latitude. We need not now enter into details how the earth's annual rotation and oblique motion, in relation to the sun, the centre of the system, fixes the tropical limits of the sun's apparent declination south and north of the equator, and produces alternate winter and summer on either side of the line, as it will be evident that the mean annual temperature obtained at different latitudes must decrease from the equator to the poles. Had the whole surface of the earth been uniform, presenting the like relations to radiant heat, unaffected by the unequal action of disturbing causes, the mean temperature of every point would have been in proportion to the radius of the parallel of latitude. But the mean temperature of places, calculated according to Dr. Brewster's formula, from an equatorial mean of $81^{\circ} 50'$ Fahr., differs considerably from the mean obtained by observation. The mean temperature is usually higher at the same latitude in the Old World than in the New, and in north latitude than in south. Thus the isothermal line of 59° Fahr. traverses the latitude of 46° in Europe, but descends to latitude 36° in America. The general causes which disturb the symmetrical distribution of temperature, are the annual variations of the upper equatorial and lower polar currents of the atmosphere, the differences of its contained humidity, the unequal distribution of land and water in various countries, the peculiarity of the surface land, and its relative height above the level of the sea—all of which causes have more or less influence in determining the local temperature or climate of countries, and in fixing the isothermal lines that mark out the zones of disease.

The zones or belts of disease thus marked out on the globe by Dr. Mühry and Mr. Keith Johnston, are the tropical, temperate, and polar zones; which are distinguished on Mr. Johnston's map by being respectively coloured brown, green, and blue. The limit of the north tropical zone, and consequently the southern limit of the temperate zone of this hemisphere, is formed by the isothermal line of 77° Fahr., or 19° Reaumur. It traverses, in America, Cuba and Florida; skirts the Cape de Verde Islands to Africa, where, extending beyond the mathematical limits of the tropic, it passes the northern part of the Sahara below Algiers, runs through Egypt, Northern Arabia, and Persia, into China, where it sinks into the Pacific Ocean, and below the limits of the northern tropic. The limiting line of this zone ascends somewhat in summer, when the sun is north of the equator; and descends again in winter, when the sun is to the south of it.

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This is the peculiar habitation of the worst forms of malarious, intermittent, remittent, continued, and yellow fevers, and of those diseases found in alliance with them—as dysentery, diarrhœa, cholera Indica, and affections of the liver. Its northern limit is the southern bar to the prevalence of epidemic contagious typhus, which is the proper and peculiar product of the northern temperate zone. The marsh malarious fevers of the tropical zone prevail most in flat, low-lying countries, possessing a damp argillaceous soil. They usually make their appearance soon after the setting in of the rainy season, or when overflowed grounds—as rice-fields, the oozy beds or mouths of rivers, and irrigated cane plantations—begin to dry up and leave portions of wet land exposed to the sun. So many and varied have been the observations made in respect of this, that they force upon us the inference that the general cause producing these fevers, in all their different forms, must be a miasm emanating from the soil, and acting as a poison on the blood. Some have been even bold enough to assert that the matters so emanating may be condensed and made susceptible of observation under the microscope; but we must honestly confess that as yet we are unacquainted with the specific nature of this miasm, and whether it differs in kind or not. This we know, however, that intermittents, and fevers of a remittent and continued type, appear in all countries under similarity of climate, season, and soil, when the mean temperature of places exceeds 2°—3° of Reaumur, or 41° of Fahr. The constant occurrence and similarity of these diseases (the type of which Mr. Johnston demonstrates the bilio-putrid type of summer and autumn), in various countries, and under similar conditions of temperature, soil, and moisture, concur to prove that they depend on these agencies, and are the consequences of a common cause. Dr. Mühry's theory of its nature assumes that it is a vegetable fungous organism; but to the validity of this we cannot assent. The mortality from the entire class within this zone, as Mr. Johnston tells us, amounts to seventy-five per cent., and decreases with the lowering of temperature in the seasons of their occurrence. In a series of dysentery epidemics narrated by Ozonam, thirty-six occurred at the end of summer, twelve in autumn, and only one in winter.

The space between the tropical and polar zones, known as the temperate zone, is inhabited by that part of the human race which is capable of manifesting the greatest amount of bodily and intellectual vigour. It is limited southwards by the isothermal line of 77° Fahr., and northwards by that of 41° of the same scale. This zone may be said to embrace the extreme climatic conditions of the two other zones, under the seasons of summer and winter. At these periods the prevailing disorders to which armies and military masses, moved from one country to another, must be more peculiarly subject, will partake alternately of the character of diseases prevalent within the tropical and polar zones. The results and experience of the Crimean expedition have afforded ample evidence of this fact. In the Crimea more particularly, and in the European countries of this zone also, both soldiers and seamen, but specially the former, will suffer greatly from diarrhœa and dysentery in summer; from intermittents, fevers of a remittent

and continued type. The latter, under bad diet and imperfect ventilation of the soldiers' huts and hospitals, soon degenerate into genuine *contagious typhus*. This true typhus, once so prevalent, and now, under a better and more scientifically-administered sanitary system, but rarely seen, as well as the true glandular plague, have their special habitation in this zone, between the thirtieth and fortieth degrees of northern latitude; and though propagated occasionally beyond these limits, by a secondary and specific poison generated from human bodies, they have evidently a distinct primitive origin from local and atmospheric agencies.

Mr. Johnston's comments on the epidemic prevalence of *plague* and *typhus* present such a striking array of valuable statistical facts, that we cannot better familiarize our readers with the peculiar character of these diseases, than by quoting a portion of the author's remarks thereon:

"The *Plague* has its endemic seat on the eastern shores of the Mediterranean, where it has been known to exist since the middle of the sixth century. . . . It may be considered as occupying permanently a portion of the Old World; extending between the parallels of latitude 29° and 42° north; and while it is thus permanent in some places, it appears more or less frequently in others. Its term of periodicity was reckoned to be—for Constantinople nine years, Egypt five, Aleppo ten, Antioch fifteen, and Cadiz forty-three years. In Sydenham's time it was said to ravage England every forty years. It has not appeared in Scotland since the reign of Charles II., although it remained a few years longer in England. It seldom extends to the southward beyond Siout in the valley of the Nile, or Jiddah on the Red Sea. In Asia it prevails chiefly on the coasts of Syria, and a portion of the shores of Asia Minor, where it sometimes ascends the river valleys. In Europe it is endemic only on a part of the eastern coast of Turkey. In 1816 it was very destructive in the Ottoman empire, and extended into Austria, Italy, and Sardinia; and it was at Moscow and Marseilles last century. In 1841 it raged in Syria and at Erzeroum with great violence. It has never yet appeared in the southern hemisphere, nor in America.

"Like the yellow fever, the plague appears to be limited to the lower portions of the earth's surface, the more elevated situations being usually exempt from its scourge. When it is ravaging the lower quarters of Constantinople, the inhabitants of the higher portions of the seven hills on which the city is built often escape altogether; and Brayer mentions a village situated on Mount Alem Daghl, at an elevation of about sixteen hundred feet above the sea, where it was never known to appear, and which was resorted to as a place of refuge for the citizens; and there is a place in Malta hitherto inaccessible to the disease, and on this account called *Safi* (pure). It is recorded by the French physicians, that during their occupation of Cairo, the plague never reached the citadel of that city; and Clot Bey states that it, as well as the village of Loumeldik, situated at a considerable elevation, was spared during the epidemic of 1835. The nature of the soil has much to do with the development of this disease. As an argillaceous soil is most favourable for the development of malarial fevers, so it is a characteristic of the localities where the plague is endemic. . . .

"*Typhus*.—This form of fever, which occurs frequently as an epidemic, appears to belong exclusively to the north temperate zone, and even here it avoids extreme latitudes. It is scarcely ever mentioned by medical voyagers in hot countries. As yellow and intermittent fevers occur in low latitudes, near the level of the sea, so typhoid fevers have their base line in a high latitude, and

and diet and imperfect ventilation degenerate into genuine plague so prevalent, and now, ministered sanitary system, and plague, have their special limits and fortieth degrees of prevalence occasionally beyond these limits generated from human and native origin from local and

the prevalence of *plague* and valuable statistical facts, that with the peculiar character of one of the author's remarks

on shores of the Mediterranean, the plague of the sixth century. . . . a portion of the Old World, and 42° north; and while it is more or less frequently in others, Constantinople nine years, Cadiz forty-three years. In every forty years. It has not been in II., although it remained as far as to the southward beyond the Red Sea. In Asia it prevails on the shores of Asia Minor, where it is endemic only on a part very destructive in the Ottoman Empire and Sardinia; and it was at one time raged in Syria and at Erzerum and in the southern hemi-

be limited to the lower portions being usually exempt from the quarters of Constantinople, the hills on which the city is situated as a village situated on Mount Olympus, 1200 feet above the sea, where it is reported to as a place of refuge hitherto inaccessible to the plague. It is recorded by the French that the plague never reached the city, as well as the village of Constantinople, as it was spared during the epidemic with the development of this disease for the development of localities where the plague is

usually as an epidemic, appears, and even here it avoids the city by medical voyagers in hot climates in low latitudes, near the equator, and in a high latitude, and

at a greater elevation. Yellow and intermittent fevers decrease from south to north; but typhus, on the contrary, decreases from north to south. In America, typhoid fevers diminish in frequency beyond the parallel of 45° north. Typhus does not appear among the fur stations of the Hudson Bay Company between the parallels of 48° and 58° north; and no mention is made of its occurrence among the crews of the Arctic voyagers nor among the Esquimaux, who live in close, unventilated snow-huts; neither has it been observed by Hermann and Wrangell among the inhabitants of Siberia. Typhus has, therefore, a northern as well as a southern limit. In Western Europe it prevails between the parallels of 44° and 60° north, or between the isothermal curves of 48° and 52°; and in North America between the parallels of 32° and 48°. In places where the mean annual temperature rises above 62°, or falls below 40°, it prevails but little in either continent. The geographical and climatal limits of typhus in Europe and America will be found to correspond nearly with those of the glutinous cerealæ and the potato. It decreases with elevation; and to this cause has been attributed its absence in the hospital of Madrid, 1995 feet above the sea. It occurs in every season, but is most prevalent in autumn and winter." (Johnston, p. 121.)

Yellow fever also, from the tropical regions, makes occasional incursions into this zone, when favoured by tropical identity of climate. Under high degrees of temperature it has been met with both at Gibraltar and Cadiz; and has extended, in America, southwards beyond its usual limits, under like favouring circumstances. But as soon as the temperature falls below 55° of Fahr., the importation of yellow fever into this zone becomes impossible, and supersedes the necessity of quarantine. Elevation of site above the level of the sea, by its association with decrease of temperature, exerts the same agency in limiting or extending the prevalence of yellow fever, as does increase of latitude. On this subject, and the perpendicular distribution of the disease, we again quote from Mr. Johnston:

"Perpendicular Distribution.—From a similar cause, decrease of heat, the yellow fever never appears beyond a certain elevation. At Xalapa, in Mexico, on the same parallel as Vera Cruz, but 4330 feet above the sea, it is unknown. Maroon Town, and the Phoenix Park, Jamaica, are noted for healthiness; and while the pestilence of yellow fever rages in the low grounds and along the coasts, cutting off thousands annually, these elevated regions enjoy a complete immunity from its effects; for that bane of European life has, according to Major Tulloch, never been known, in any climate, to extend beyond the height of 2500 feet. The inner Cabrite 430 feet, and the outer Cabrite 590 feet in elevation, are also remarkably healthy. In the island of Grenada, Mount Cardigan, 500 feet, and Richmond Heights, 730 feet, are not sickly. Mount Desmoulin, near Roseau, in the island of Dominica, 1500 feet above the sea, has invariably been free from yellow fever. The same immunity has been observed in San Domingo, in the mountainous parts of which, whatever be the nature of the soil, this disease does not prevail. In the United States the yellow fever is never known to prevail in very high situations, whatever be the condition of the localities; but at what point it ceases to appear or prevail, is still an unsettled question. The disease varies in intensity, and in the numbers attacked, according to latitude. M. Moreau de Jonnés shows, by elaborate statistics, that in the United States the mortality amounts to one-half of those attacked, while in Spain it is limited to a third or a fourth of the total number. This is accounted for from the difference of climate and soil between Europe and America, which in winter is so extreme, that in order to find in

Europe a cold as intense as that of the United States, it would be necessary to remove 12° or 14° farther to the north." (p. 121.)

Besides these diseases of the temperate zone, which in hot, close, humid summers afflict both soldiers and seamen, diarrhoea, dysentery, and cholera prove occasionally most destructive of life. During winter, again, soldiers and seamen within the temperate zone will suffer from *gelatio*, or frost-bite, erysipelas, scurvy, and influenza; as in the polar zone, when not provided with suitable diet and clothing, as preventive means against these diseases.

The polar zone, again, is directly opposite in climate to that of the tropical zone. Its southern limit is the northern boundary of the middle or temperate zone, being the isothermal line of 41° Fahr., or 2° or 3° of Reaumur; while its northern limit extends 8° or 12° below the zero of Reaumur. It commences on the western coasts of North America, above Sitka, sinks downwards till it comes to Canada and Newfoundland (52° N. L.), and running across to Europe, ascends till near the borders of Iceland (62° N. L.); from whence it sinks towards Norway and Sweden, and running above St. Petersburg and Moscow, crosses Siberia (55° N. L.). Here the diseases most prevalent are affections of the skin, digestive organs, and influenza, with dyscrasial types of disease, scurvy and erysipelas; while all classes of malarious fevers disappear, except on very rare occasions, in summer, when both cholera and dysentery may occasionally prevail.

The subject of Medical Geography is intimately connected with the improvement of epidemiology, and the acquisition of clear and scientific rules for acclimatizing soldiers and seamen in various quarters of the globe. But we must be satisfied with merely drawing attention to this important point; nor can we do more than allude to the peculiarities in the climatic conditions of the tropical and temperate zones of the south, which, in respect to salubrity, may be said to surpass all others.

We have endeavoured to give an exposition generally of the principles of Medical Geography, and their practical application to a better knowledge of diseases; and while we have attempted to offer something beyond a dry abstract of Dr. Mühry and Mr. Keith Johnston's valuable labours in this field, we gratefully acknowledge the vast amount of carefully analysed facts and statistical information they have brought to bear, and thus augmented our sources of true knowledge. We would only, in conclusion, express a hope that we may receive many like contributions from these authors.

REVIEW IV.

Was the Roman Army provided with Medical Officers? By J. Y. SIMPSON, M.D., F.R.S.E., F.R.C.P., Professor of Medicine and Midwifery in the University of Edinburgh.—1856. pp. 29.

NOTHING can be more obvious than the conception of a parallel between the pursuits of the physician and those of the antiquary. Both, to a certain extent, practise conjectural arts, where, from something that

is revealed, the task is sagacity is required for remote, observe accurate sible, and collate careful necessary conditions being infer prudently and safe be more interesting than of paramount importance curious, in the antiquary congruous, it is no wonder also zealous antiquaries; and William Hunter.

their manifest difficulties the mind whose temptations in both to leap a fault, and in the other. A subject for archaeology itself with a medical qu as because it presents which many resources (appliances of ingenious exercise; and the more more direct, and the more certain results. If the show, that to enter the ground, and among paths the most vigilant circ spirit towards Dr. Simpson ledge and admire; and class with those, and to often antiquarianism a tribute our own humble has selected, as these none of our perusal of his more and casual as to previous to at least our more aspire to the merit of they can attract or readers to the remarks.

Dr. Simpson opens "little or nothing has the medical staff of the previous discussion of selves had no opportunity general, yet important Heckert and Haeser."

* *De Medicinæ Militaris* :
† *Geschichte der Heilkun*
pages, and show the usual
himself as largely indebted
‡ *Lehrbuch der Geschich*