

title of "oscillation of the eyeball." This oscillatory movement is rotatory round the antero-posterior axis, and is not to be confused with the oscillatory movement from side to side by the lateral recti, which is not uncommon, and has received a different name. He observes, "in oscillation the eyeball is affected with an almost perpetual rotatory motion round its antero-posterior axis. The patient is not conscious of this motion, from any particular feeling he has in the eyes, nor can he restrain it. It goes on even when the lids are closed, but it ceases during sleep. The motion varies in extent, from a scarcely perceptible degree, to perhaps nearly a quadrant. In some cases the motion seems to be rather from side to side, but often so small in degree and so rapid, that it is difficult to say what is exactly its direction. In general, it is pretty distinctly rotatory, and seems to be produced by the antagonising action of the obliqui, the recti having lost, in a great measure, their control over the eye."

(To be continued.)

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ARTICLE IV.—*Medical Topography of the Western Coast of Africa.*  
By D. RITCHIE, Esq., Surgeon, R.N.

To the philosopher, the philanthropist, or the physician, the conditions of the western coast of Africa, in relation to its adaptation to the development and maintenance of human life, must ever be a subject of deep interest. From the river Gambia to the Congo, along a coast line of about 2000 miles, presenting many varieties of geological formation, the soil possesses a lavish fertility equalled by no other portion of the globe of similar extent. The temperature, vibrating between 70° and 90° of Fahrenheit's thermometer, neither debilitates nor oppresses the mental or physical powers of the European. These circumstances would have constituted this the paradise of mankind, did not the skeletons of past generations rise in gloomy array over the desolate scene, warning away the pioneers of civilisation. The ever-verdant surfaces of nature promised those who had gone before a rich possession; but beneath its umbrageous canopy they have only found an unknown grave. Their memory, and the impress of their intellectual power, have proved alike evanescent; the luxuriant vegetation obliterates rapidly their most enduring works, and the native glides back with a natural proneness to his original debasement, the germs of progress withering in an ungenial soil.

From recent personal observations of the places of most interest to the European along this coast, I propose, in the following survey, to give a rapid sketch of its general character, and occasionally of its local influences, in averting or in generating disease. Should the labours of the scientific, or the fortunate energy of the

mere adventurer, at last triumph over these, an object of incalculable importance to the future of mankind will have been gained. This may be supposed still at a distance, but it is not the less necessary for present observers to endeavour to raise a pyramid from the top of which some fortunate genius may at last discover the way to preserve health amid these scenes.

When approaching the coast in the latitude of the river Gambia, the sea changes from the dark blue of the deep ocean into a turbid flood, teeming with animal life, and a pale leaden or yellowish tint pervades the sky. These deepen as we draw nearer the shore, until it is observed like a faint yellow streak lying on the horizon, with dark masses of primeval forest rising over it, at first resembling distant islands, but by degrees spreading out into one unbroken sheet, through which the course of the river forms the only gap. This is between three and four miles wide at its entrance, owing to the reflux action of the surf, which stems its muddy waters; further on, however, its breadth increases to seven or eight miles, and it resembles a sluggish lake, bearing on its surface myriads of small, brown, globular medusæ. The tide, which rises only six feet at its mouth, is sensibly felt above 500 miles in the interior, so level is the surface through which it winds its anfractuous way. From this to Sierra Leone, comprising a coast line of above 300 miles, the general features of the country are the same. From the mountains of Senegalia, numerous streams descend, laden with debris; these coalesce and communicate with each other as they approach the sea by numerous creeks, indicating the process of their formation, through the agency of the surf rolling back the alluvium mingled with sand upon the mouths of the rivers, thus forcing them into new channels. The intersections of these form numerous islands, which become more detached the nearer the sea and the newer the formation. Their surface is but slightly elevated above high-water mark, and the dry soil is invaded by swamps nourishing a luxuriant aquatic vegetation, in which the crocodile or hippopotamus can alone find a congenial habitation; or by stagnant pools, over which the dark mangrove throws a funereal gloom. When, however, the matted and ever vernal forest is cut down, a rich black loam, resting on a sandy bottom, is found, the fertility of which amply repays the labours of the indolent cultivator with every article adapted to his wants.

Bathurst, the first British settlement on this coast, is situated at the mouth of the river Gambia, on the hot dry sands of the island St Mary. The population consists of between thirty and forty white men, and 2000 negroes; the former is constituted by the functionaries of the colonial government, the missionaries, and individuals engaged in commercial pursuits, for which this appears an advantageous position—as the river is navigable for vessels of considerable tonnage above 600 miles into the interior, and as we

maintain a wide influence by garrisoning Barra Fort on the opposite shore, and Macarthy's Island 250 miles up the river.

In regard to its collateral conditions, no situation could at first sight appear more prejudicial to health than this,—a low island, surrounded by a broad marshy beach and almost stagnant waters. This view is, however, shown by experience to be incorrect. In no other locality along this coast is endemic disease found less prevalent or fatal.

The rainy season commences in June and terminates towards the end of September. During all this time rain is more or less frequent; but in July it occurs nearly every day, accompanied with north-westerly winds. Tornadoes are most frequent in the beginning and towards the end of this season. They always come from the eastward, and produce violent electrical phenomena. This period of the year is the most pregnant with disease. Fevers are frequent amongst the white population, and not uncommon amongst the negroes. The latter, however, suffer more from dysentery, the consequence apparently of the limited supply of good water, and the frequent use of that laden with impurities, when the system is already disposed to disease by the febrific forces existing around them. It is, however, certain that individuals may live here for years in the enjoyment of excellent health, by employing ordinary caution, without suffering from either of these. They possess no specific to account for this immunity, beyond the careful maintenance of the vital functions in a normal condition, and the steady avoidance of whatever would interfere with it.

The comparative salubrity of this place appears to arise from two causes. The first of these is the abundance of the means of subsistence and comfort within the reach of all. The second is the purity of the atmosphere, and its low temperature during the winter months.

The equatorial currents of the ocean and of the air are kept up by fresh supplies from the temperate zone. This fact is absolute as regards the ocean; but in relation to the air, which is affected by so many disturbing causes, it can only exist in a modified degree. Even in this, however, it is obviously sufficient to counteract the influence which the scorching winds from the great desert, lying in the same parallel, would produce, an influence not unfrequently experienced in the hurmattan. From these causes the temperature is kept moderate,—never reaching 90° in the hottest day, and very often descending to 70° during the six dry months; thus giving a pausing time for the system to recover from its state of exhaustion, and to eliminate or reconstruct the effete or imperfect organisms which are cumbering the vital processes, or perhaps ready to be transformed into a poisonous compound on the application of the first exciting cause.

Sierra Leone, the situation of the second British settlement, according to the order I intend to pursue in describing this coast,

comes next under consideration. It may be viewed as the terminating ridge of that lofty chain of mountains which traverse nearly this parallel of latitude, to which the names "Kong," and "Loma," have been applied. Formed of plutonic rocks, of which granite is the predominating ingredient, with quartz and ironstone in smaller but still considerable masses, it rises boldly to a height of nearly 6000 feet, overlooking the broad estuary at its foot, into which several rivers discharge their muddy waters, and the low alluvial country to the north already described.

Viewed from the sea, the general aspect of this place has been considered by most visitors beautiful, in consequence of the commanding situation of Freetown, the seat of government, which lies along an elevated slope, with the citadel rising behind it, and on a ridge still more elevated the buildings required for the residence of the troops. The shaggy mountain, covered with a brilliant vegetation, and piercing the wreaths of vapour which generally roll round its rugged peaks, forms a noble back-ground to the picture. The picturesque character of the whole is, however, diminished by the extensive removal of the natural forest, and the consequently parched appearance which the surface presents, particularly during the dry season. This may be advantageous to health, but certainly the comfort of the inhabitants would have been increased by leaving shady rows of trees along the roadsides, and perhaps even along the sides of the streets, without any deleterious influence resulting.

The British territory consists merely of a peninsula, which is surrounded on three sides by a rocky abrupt beach, broken occasionally by white sandy bays. Its rugged surface is covered by a scanty red earth, which may be rendered by cultivation remarkably productive. This is very palpably exemplified by the comfortable condition of the negroes, who have erected a number of scattered villages, at various degrees of elevation, along its shelving sides.

There is no swamp or cavity where water can remain stagnant in the vicinity of Freetown, with the exception of a narrow low valley, which lies about a mile to the westward. To this some have attributed the fatal power of propagating those fearful epidemics which have devastated again and again this place, and of impregnating at all times the surrounding atmosphere with the germs of disease, to the extent of rendering the deadly nature of this climate a proverb to mankind. Others, however, considering this source unequal to such results, have attributed them to the marshy shores of the low alluvial land to the eastward, called the "Bulloms," the nearest point of which is distant not less than five or six miles.

It is strange that men of discernment should have clung with such tenacity to the idea, that the relation of swampy exhalations to fever constituted alone that of cause and effect, when evidence

existed on every side of fever of the most fatal type prevailing in an equal degree, in situations where no marsh did or could exist, as at Fernando Po, the Ilhas dos Idolos, or in the British settlements on the Gold Coast, and in many other situations.

Evidence of a perfectly demonstrative character exists, that fevers of the most malignant kind frequently arise from exposure to emanations from animal or vegetable matters in a state of putrefaction. That this is not a universal cause is not less true; but, notwithstanding, the anxiety to discover some reason for the extraordinary prevalence and fatality of fever in this settlement, has led able men to pervert their powers of observation so far as to magnify the natural decay of a few scattered leaves or branches into pestilential hot-beds of disease. The truth is actually the reverse. The sloping sides of the mountains do not admit of accumulations of decaying vegetable matters and stagnant waters; besides, here as throughout the tropics, life predominates, and there is little of that deciduous decay observable in the temperate zone. The vegetable world is ever verdant, unless on the arid declivities, where it perishes in the dry season. It is universally known that this is not the time most productive of fevers, but that they are to be dreaded during the rains, when vegetable forms are endowed with unwonted activity, and even the putrefactive process appears to be transformed into vital energy,—new forms of organisation so rapidly succeeding the destruction of the old.

Believing, then, that these causes—marsh miasmata, or putrid exhalations—are inadmissible, in explanation of the febrific forces existing in this settlement, and equally inapplicable in many other situations along this coast, to what are they to be ascribed? The extremely variable intensity with which these forces operate, would appear to indicate that they cannot reasonably be referred to one collateral condition of the surrounding media, but that one or more must unite, with a peculiar predisposition of the internal organisation, before the effect—fever—is produced.

It may be laid down as an axiom, that fevers possessing a similar type are produced by the same causes. The endemic fever of this coast, then, being intrinsically the same disease, must arise from causes as widely applicable as the liability to it exists. In consequence of its general diffusion in localities far apart, and possessing very opposite conformations, and also the peculiar exemption which some situations and certain individuals enjoy, these may be arrived at with a tolerable certainty. They are essentially a high range of temperature; an atmosphere loaded with moisture; the neighbourhood of active vegetation or its products; an elevation not far above the level of the sea; and more than all, a condition of the system disposed to febrile action. The only method by which we can arrive at a certainty, with regard to these influences, is, by comparing the correlative circumstances in those cases where a temporary exposure, in various and definite places, is succeeded within a definite

time by febrile action. This is a necessary course to be pursued, as erroneous conclusions are apt to be arrived at, in consequence of the length of time the germs of the disease may remain latent in the system. Proceeding, then, in the inquiry upon these principles to the examination of the facts recorded, together with those the result of personal observation, the conclusion appears inevitable, that the preceding conditions are those alone essentially requisite in the production of fever.

A high temperature,—that is, a range of the thermometer between 80 and 90 degrees, has often been observed as the precursor or concomitant of the fully developed malignancy of various epidemic or endemic pestilences in distant parts of the world. That a similar temperature is necessary to the production of coast fever appears to me not less obvious. Comparatively few cases arise where this is not a concomitant; and I believe none where it has not exerted its influence as a predisponent. It is universally observed at all times and places where this disease prevails, not, however, acting alone, but always conjoined with a humid state of the atmosphere, and becoming, in proportion to this humidity, the more energetic.

From the Gambia to the Congo, the difference of temperature between the wet and dry bulbs of Fahrenheit's thermometer varies from 1 to 4 or 5 degrees, according to the season, the weather, or the latitude; but, except under the temporary influence of the hurmattan, it is never seen in the neighbourhood of the coast greater than the latter; thus indicating at all times the existence of a very large amount of aqueous vapour in the surrounding atmosphere. Towards either of the extremes mentioned above, the variation is greater than between Sierra Leone and Cape Lopez, in consequence of the breezes from the temperate zone renewing occasionally the saturated atmosphere, and in an equal degree checking the production of fever.

No doubt can exist of the deleterious influence of heat and moisture combined upon the human constitution; but nevertheless they do not in themselves appear efficient causes of the endemic fever of this coast. The cause or causes, wherever they exist, must always be equal to the production of a certain effect; this is not accomplished by these, and therefore it becomes necessary to conjoin a third power—the neighbourhood of active vegetation or its products. The actual distance to which the influence of this may extend cannot with certainty be ascertained; but it is very certain that it increases proportionally to its nearness, as the crews of vessels which cruise a few miles distant from the coast do not suffer, and the inhabitants residing on a barren situation are not liable to be attacked. It is also ascertained, by experience, that clearing the soil of its natural wood renders a locality more healthy. That the vegetable product should be in a state of decay does not appear a necessary condition to the production of the common

endemic fever, although evidence of the most convincing kind exists of its influence in exciting febrile action, and that often in the most intense form. As an opportunity will occur in pursuing the description of the coast, of more fully illustrating the influence of organised matter, I shall now proceed to the fourth co-efficient, namely, low situation. Little available evidence of the actual extent of this exists, in consequence of all the settlements made by Europeans in this part of the world being only slightly raised above the level of the sea, with the exception of Sierra Leone. There, however, the superior salubrity of the barracks, at a height of some 200 feet above the town, and, in a greater degree, of the habitations higher up on the mountain, gives countenance to the supposition, that it is only in the lower strata of the atmosphere that the germs of the disease are to be found.

These conditions of the surrounding media are universally observed where the origin of pure remittent fever can be rigorously traced. They are, however, in themselves obviously unequal to the causation of the peculiar morbid phenomena without a concomitant condition of the system disposing to these. This condition appears essentially to be a relaxation or diminution of the forces of vital affinity, induced by all those causes which tend to diminish this, by deranging the functions or the elements of organisation. Where these exist in full vigour, and uncontaminated, the febrific influence fails in producing its series of morbid transformations. It, however, retains its specific power for a period not very precisely ascertained, but known to extend from a day to a month or six weeks; yet most frequently developing itself after the lapse of eight or nine days.

What this influence *is* remains still a mystery; but, from the circumstances attending its evolution, diffusion, and development, there appear good grounds for believing it to be an organised germ generated either in the surrounding media, or in the effete or excrementitious matters of the system itself under the influence of these.

(*To be continued.*)

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ARTICLE V.—*Cases of Stricture of the Urethra.* By FRASER THOMSON, M.D., Perth, Visiting Surgeon to the County and City Infirmary.

CASE I.—John —, æt. 51, occupation a shoemaker, admitted on March 1st, 1851, on account of stricture of the urethra. The patient is a rather unhealthy-looking, and a very dissipated, man, and has suffered from his urinary complaints during the last twenty years. He attributes his disease to a gonorrhœa which he had contracted in his youth.

About twenty years ago, having been for some time labouring