course, impossible to many to carry out researches in this fashion; it was reserved to men who were in a position which allowed it. He thought it clear that this new drug was likely to supersede digitalis, not only on account of its qualities, but also because it would appear to be free from certain undesirable properties. He would be glad to get some as soon as possible to use for his patients.

Dr. NORMAN KERR (London), while joining in the chorus of approval, would like to enter a caveat against resigning the virtues of digitalis in favour of the new drug. Treating patients in private practice was a very different matter from treating patients in hospitals. He trusted, however, that there would soon be an ample supply of strophanthus, so that it might be tried on patients.

Dr. FRASER, in reply, said that he was gratified with the manner in which his paper had been received. There were one or two points on which perhaps he ought to make a little explanation. In the first place, in regard to Dr. Dudley Buxton's questions, he had employed the substance in other cases besides those of cardiac disease, and in some of them a diuretic action had been manifested; but he was not prepared to go any further than to say that it was in disturbances of the circulation, where the blood-tension was unduly low, that strophanthus was capable of producing a diuretic effect. There was not, so far as he knew, any other action than that upon blood-tension. As to its action upon particular districts of the vascular area, he advanced some reasons for believing that almost no action was produced by this substance upon blood-vessels directly; and, therefore, it was very improbable that it should single out the vessels of the glomeruli to the exclusion of the rest of the vascular system. Besides, he did not know that it was necessary to bring such an action into consideration; because, if an agent increased blood-tension by operating upon the heart, the increased blood-pressure acted on the vessels of the kidney, as elsewhere—a condition which would account for the diuretic action. This was a point of great interest; but it was also a point which it was very difficult to demonstrate, and he did not pretend to say that it could be regarded as a settled question with this or any other substance. In regard to what Dr. Norman Kerr said, Dr. Fraser had avoided saying anything as to the therapeutical value of strophanthus being greater than that of digitalis. He endeavoured to restrict himself to the data which observation had given, but he was not prepared to say whether the differences between the action of strophanthus and digitalis would constitute decided advantages. He was glad that this point had been referred to, because there was often a tendency to become unduly enthusiastic over new remedies; and he thought this was a danger to be avoided. In regard to the supply, it had been very difficult to obtain enough to enable him to continue his researches; and he was indebted to Mr. Buchanan, of Blantyre, for a large quantity which had recently reached him. He understood, however, that a demand for this substance had arisen, largely on the part of his former students; and the importers were now on the look out for it. He had heard that an enterprising importer expected to have a large supply immediately.

A demonstration was given of the action of strophanthin on the frog's heart; the action of this drug, in the proportion of only 1 in 1,000,000, in the blood circulating through the heart, by means of Williams' apparatus, as shown by the tracing on the revolving cylinder, being to reduce the normal tracing, in the course of five minutes, to a straight line, after producing a lengthened systole and heightened tension.

THE CLIMATE OF THE KINGDOM OF BURMAH.

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As we are, in all probability, about to engage in a third Burmese war, and as the hardships and privations which our troops underwent, owing, in a great measure, to imperfect knowledge of the country, but more so, perhaps, to the prosecution of the war in the hot and wet seasons, are well known to all who either remember or have read of those expeditions, a few remarks on the climate of this country may not at present seem inopportune, or without interest to the profession. Before proceeding, however, to the discussion of the subject in hand, it will be necessary, more particularly as the greater portion of the country is still a *terra incognita*, and one of which no meteorological records exist, to give a brief sketch of the leading features which influence the climate of tropical Asia. A glance at the map will show us that this portion of that great continent is made up of three large peninsulas, all of which are surrounded on three sides by water, and

two of which are almost entirely within the north tropical zone. They are Arabia, India, and the Hindu-Chinese or Eastern Peninsula. Of the latter, Burmah forms an important part. The climate of all, owing to latitudinal influence, is one of great heat. The main feature of Arabia, though farthest from the equator, is intense heat and dryness; that of India, great heat and a varying degree of moisture; that of Hindu-China, great heat and extreme moisture. As latitude, then, has no effect in producing these climatic diversities, they must evidently be due to other causes. Amongst these, the principal are the relief of the land, the size of the seas, and the height of the mountain-ranges by which they are bounded, or separated from neighbouring countries, as well as the character of those countries themselves.

In Arabia, the intense heat and dryness is due to the great Sahara, or desert of Africa, the hot winds from which, blowing for ages across the narrow Red Sea, have converted the country, with the exception of the hilly districts of Yemen and Oman, the Arabia Felix of old, into a desert if possible more arid and desolate than the Sahara itself.

In India, the features are briefly as follows: the lofty Himalayan mountains, which not only act as a barrier against the cold breezes of the Central Asian table-lands, but effectually arrest and disperse the rain-saturated clouds from the Southern Seas; the hot and moisture-laden south-west monsoon; the plains of India lying between the Himalayas on the north, and Vindhya mountains on the south; the central plateau, called the Deccan, hemmed in by the Western and Eastern Ghats, forming their junction in the nucleus of the Nilgiri Hills in the south-west of the peninsula. It is owing to these conditions, then, that, while the central plateau is generally dry, the country west of the Ghats, and at the bases of the Himalayan range, is deluged by rain, varying from twenty feet on the Malabar coast to fifty feet in some of the valleys of Assam. Hence, therefore, as the Western Ghats are close to the coast, and of fair elevation, and as the central plateau rises from 2,000 to 3,000 feet high, and as the Eastern Ghats are often intercepted, and of insignificant height, the climate of India will always be drier and more salubrious to Europeans than that of the Hindu-Chinese Peninsula, to which we will now direct attention.

The Hindu-Chinese Peninsula, while subject, in common with India, to the influence of a tropical latitude, of a lofty Himalayan northern boundary, and of the moisture-laden warm south-western winds, differs from that country in the following particulars. Instead of broad plains and extensive plateaux, protected from the watery winds by a sea-coast range of mountains, the whole country is cut up into a series of narrow river-valleys by long ranges of mountains, trending in a southern direction from, and at right angles to, the Himalayas in the north. This immense region, extending from the third degree beyond the Tropic of Cancer to within one degree of the equator, and including, besides British and native Burmah, the kingdom of Siam, Annam, Cambodia, and Tonquin, may be said, at all events as regards its interior, to be one of the least known regions of Asia.

We are not only ignorant of the real character of these mountains, but of the sources of the rivers themselves. It is generally believed, however, owing to their immense size and rapidity in their upper courses, that they rise, not on the southern slopes of the Himalayas, but on the plateau of Tibet, behind them. As regards the mountains, it is highly probable that, while the Yoma Aracan range, dividing the valley of Irawady from the province Aracan, and protecting it to some extent from the copious rains of the coast, is of low elevation, that between Irawady and the Salween rivers, and between the latter and the Mekong, attains, though narrow, an elevation of from 3,000 to 7,000 feet.

In the north are pressed together an extraordinary number of separate ridges, between which the rivers Irawady, Salween, Menam, and Mekong run south, in close proximity to each other, and forming, as they approach the coast, low lying alluvial deltas, producing rice in abundance. "Nowhere else," writes Mr. Keane, "are there to be found so many large rivers, running for immense distances without uniting, and only separated by single ridges."

Such is the general character of the land. The present kingdom of Burmah, excluding the low lying delta of the Irawady and Tsitoung rivers, now in the possession of England, is surrounded on the north-west and south-west by British territory; on the south-east by Siam, and on the north-east by the Chinese province of Yunnan. A very small portion, however, occupied by the tributary Shans, touches the French possession of Tonquin. It occupies the Irawady and Salween basins, the head-waters of the Tsitoung, and the valleys of the Kien-dwen and Myr branches of the Irawady. It contains 190,000 square miles, an extent of territory about equal to Spain, with a pop

estimated at 4,000,000, or 21 per square mile. Its length is about 500 miles, and its breadth 300.

Climatically, as well as politically, it may be divided into three parts: Burmah proper, occupying the valley of the Irawady, and its branches the Kienn and Myt rivers; from the British border, 18° 50', to 24° 30' N. at Bhamo, on China border, North Burmah, beyond this point, is occupied by the wild Kakyciens or Simfa. This part, which is little known, is hemmed in on all sides by mountains, and is so extremely unhealthy that, in my time, a sentence of banishment to Mongoung, a town in this region, in latitude 25° 30' N., was looked upon by the Burmese officials as equivalent to death. Besides the above, there is, in addition, the hilly country to the south-east, extending from the twentieth to twenty-fourth parallel north, occupied by the tributary Shan States, North Burmah and the Shan States are exceedingly hot and unhealthy in the wet season. During winter, the air is keen, necessitating, even as one approaches Bhamo, the use of warm clothing, and rendering pleasant at night the grateful influence of the bivouac-fire. The Shan country, situated, as it is, on western slopes of the mountains, cannot be otherwise, especially in spring and summer, than exceedingly feverish and unhealthy.

We will now direct attention more especially to Burmah proper, occupying the valley of the Irawady from Thart Myo to Bhamo, as it is here that the capital, Mandalay, in latitude 22°, and nearly all the towns of importance are situated. It is to this region, also, that the military operations will probably be confined. This being so, it is satisfactory to know that it is the most healthy, as it is the driest part of the country. In speaking of India, we pointed out the effects of the Western Ghats in obstructing rain-clouds, and thereby lessening, so materially the amount of precipitation on their eastern declivities and the central plateau beyond. Here, in like manner, does the Aracan Yoma range of mountains, and also the Pegu Yoma range, to a considerable extent lessen the rainfall, particularly in the western and central parts of Irawady basin. As the clouds, however, approach the range forming the eastern watershed of the Irawady, the rainfall must necessarily be great; as, owing to the superior height of this range, the state of affairs is somewhat analogous to that which presents itself in Assam, where, as stated, fifty feet have sometimes been registered. The influence of these mountain-ranges, though of no great elevation, has such an influence that, were the central portion of Upper Burmah a plateau, instead of a low river-valley, the climate would be excellent; even as it is, they exercise considerable influence on the rainfall of the district. Thus, while in the sea-coast districts of Tenasserim and Pegu, the precipitation varies from 200 to 120 inches, and the air throughout the year is saturated with moisture, owing, in part, no doubt, to evaporation from the numerous river-deltas, in Mandalay, in the interior, and in the same latitude as Calcutta in Bengal, it does not exceed fifty inches—a fact clearly illustrated by the production of rice, and the effect of the atmosphere on books, boots, and clothes. In Lower Burmah, rice is grown and exported in large quantities, while about Mandalay the yield is not sufficient to supply the wants of the indigenous population. Neither is our wearing apparel injuriously affected. There are three seasons: the cold, extending from November till February; the hot, from February till the end of May; and the wet, or rather wet-hot season, till the end of October. In Upper Burmah, the cold season is fairly agreeable to Europeans, and becomes more so the higher we proceed up the river. The noon-day sun is powerful still, but the mornings and evenings are cool, bracing, and pleasant. Thus there are great diurnal variations, far greater than in sea-coast districts, and necessitating great precaution to protect the internal viscera, already enfeebled from prolonged exposure to heat, against the changes above referred to.

The hot and rainy seasons are, however, hotter, and the air more still, in Upper Burmah than in the coast-districts, owing to absence of the land- and sea-breezes, the formation of the valley, and the diminished amount of rainfall. In Mandalay I have myself often, even at night in the house, seen the glass stand at 108° Fahr., and found it necessary to lie in the passage between two doors to get a little air. In estimating the effect of the climate of the Upper Irawady Valley, even in its broadest and healthiest parts, it must be remembered that this river in its upper reaches is a mighty stream, being probably two miles wide at Bhamo, and of great volume and rapidity, even as it issues through its mountain-barriers. To this cause, and to the heavy rains at its head waters, are due the annual inundations, which, commencing about June, continue during their increase, culmination, and decline, for the latter part of the summer, the departing waters leaving behind them, owing to the action of the sun on the cracking mud, a state of affairs more injurious to health than that which appertains during the inundations themselves.

Thus the period from the advent of the rainy season to the fall of the river, and for some time after, is exceedingly unhealthy for Europeans in Mandalay, and other low-lying places in the valley. The rains coming on after the great heats of March and April, find the system in a state favourably suited to the production of a disease of the abdominal viscera. In the capital, in June, dysentery may be said to be epidemic among the natives, while, in those parts of the city subject to inundation, it largely prevails, after the fall of the waters.

During two months, in my house situated in the compound of the British Residency, the water around and under it was between four and five feet deep. The houses are all built on piles, and constructed of boards and bamboo-matting. Thus they afford perfect perfusion of air, and are well adapted to maintain the health of the natives, as they would, perhaps, also that of Europeans if situated beyond the reach of inundation, and had they foundations properly drained and concreted.

The prevailing diseases among Europeans, contracted in the capital and other well cleared towns on the river, are dysentery, fluxes, and acute hepatitis. Fevers, so prevalent and virulent in the remote villages and amongst those engaged in the occupations of forestry or mining, rarely originate in the capital; at least, those which came under my notice occurred in the outlying parts of the country. As regards the prevailing diseases—dysentery, hepatic affections, fluxes, and fevers—although I have no statistics to offer, I may say, as the result of my own experience, from considerable practice amongst the Europeans of all nationalities, as well as the Chinese and river-population of the Irawady-flotilla, that the Anglo-Saxons, or, to speak more correctly, the British and Germans, were more predisposed to hepatic diseases and fluxes than the French or Italians, and the Chinese Eurasians less so than either. Fevers, on the contrary, seemed to attack all with equal impartiality, the only predisposing qualification being that of newness to the feverish district.

In my time, out of three medical men, one of whom only (myself) was in active practice, one succumbed to hepatic abscess, one to fever, and the third (the writer) was placed *hors de combat* from abscess of the liver following dysentery, and brought on from a chill caught in the discharge of the duties of his profession.

As regards the seafaring population, climatic disease was essentially rare among the superior and well fed European sailors, while of frequent occurrence among the common sailors, natives of India.

Of six young Frenchmen, missionaries, who arrived brimful of health, and went into remote stations, after three years' residence, but one remained in the country; the rest either died or went home. The Chinese also suffered much from these affections; thus, by far the worst and most pernicious fevers I have ever seen occurred among the Chinese Mohammedan refugees, brought on from exposure, during their flight overland from the frontier of Yunnan to Mandalay.

A word in conclusion with reference to the probable dangers to the expedition now about to ascend the river. If completed before the advent of the hot season, no disease beyond that incidental to all military operations in tropical countries need be apprehended. Should it be extended into the hot season, and particularly if guerilla operations be necessary, many cases of sunstroke may be feared; while if the wet season sees it still incomplete, dysentery, fevers, and hepatic affections will cause many deaths and much invaliding. Small-pox also, owing to the absence of vaccination and the practice of the vicious system of inoculation, is an exceedingly prevalent disease, and may give rise to much suffering among susceptible Europeans exposed to its contagion. Much more might be written on this subject; but, owing to the great pressure always existing for space in the columns of the BRITISH MEDICAL JOURNAL, I now finish up with the hope that what I have said may enable my brethren to obtain some slight idea of the climate of Burmah.

A CASE OF STONE IN THE BLADDER OPERATED UPON A SECOND TIME.

By CHARLES WILLIAMS, F.R.C.S. Ed.,
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On February 9th, 1879, I was requested by Mr. Morton, of Aylsham, to visit with him the gentleman on whom I had performed lithotomy in July, 1876. I found him suffering from symptoms indicative of stone in the bladder. He was micturating eight or ten times during the night, and much more frequently during the day; he could not ride in a vehicle without experiencing excessive pain in the bladder; the stream of urine often stopped abruptly whilst he was passing it,