positive judgment or intelligent criticism concerning them. If correctly reported, Pasteur is convinced that he has discovered means by which the virus of hydrophobia can be attenuated, and that, by the inoculation of the attenuated virus, individuals may be rendered, for the time being, insusceptible to the disease. The attenuation is said to be effected by preserving for a variable length of time pieces of the spinal cord of rabbits which have been inoculated with the hydrophobic virus. The longer the pieces of spinal cord are preserved, the weaker becomes the virus contained in them. It is evident that the spinal cord must be preserved in a manner not to decompose, and at the same time not to destroy at once, the hydrophobic virus. We are not informed how these ends are accomplished, but in accordance with Pasteur's doctrine of attenuation of virus, they must be reached without any obstacle to the free access of oxygen to the specimen. Of especial interest is the statement that inoculation with attenuated virus will prevent the outbreak of the disease, even when this inoculation is performed after the reception into the body of the strong virus by the bite of a rabid animal. There is no information as to whether this inoculation is effectual after the development of the symptoms of hydrophobia or not.

The conclusions of Pasteur, coming from so great an authority, will receive, as they deserve, respectful and serious consideration. It is understood that for no less than five years Pasteur has given the greater share of his time and labor to the study of hydrophobia. It is probable that his conclusions are based upon a large number of careful experiments upon animals. The two or three reported instances of preventive inoculation of human beings, which have excited such popular interest, and which have been reported with so much dramatic detail in the newspapers, can hardly lay claim to much scientific value in proof of Pasteur's views. Even if the number of reported cases were much larger, it would be necessary to use great caution in drawing from them positive conclusions, in view of the facts that the period of incubation of hydrophobia is very variable, and sometimes of many months' duration; that a considerable number of those bitten by rabid dogs never contract hydrophobia, even when no especial treatment has been adopted; and that there is great popular ignorance as to the symptoms and means of recognition of hydrophobia in dogs.

There is no evidence that the real nature of the hydrophobic virus has been discovered; indeed, we have, in June of the present year, the positive statement of Bouley, who is believed to be familiar with Pasteur's work, that no organism has been isolated or cultivated which can be considered to be the virus of hydrophobia, and that Pasteur's researches have been conducted without a knowledge of the biological properties of the suspected organism. The whole subject of immunity from disease by preventive inoculation is in a very unsettled state. We possess a mass of superficial observations and undigested conclusions on the subject, but we have very few positive and well-established facts. It is to be hoped that Pasteur's researches upon the inoculation and cure of hydrophobia will be found, when they are fully published, to add greatly to our knowledge of this subject, and that the blessings which are anticipated from his discovery may be realized.

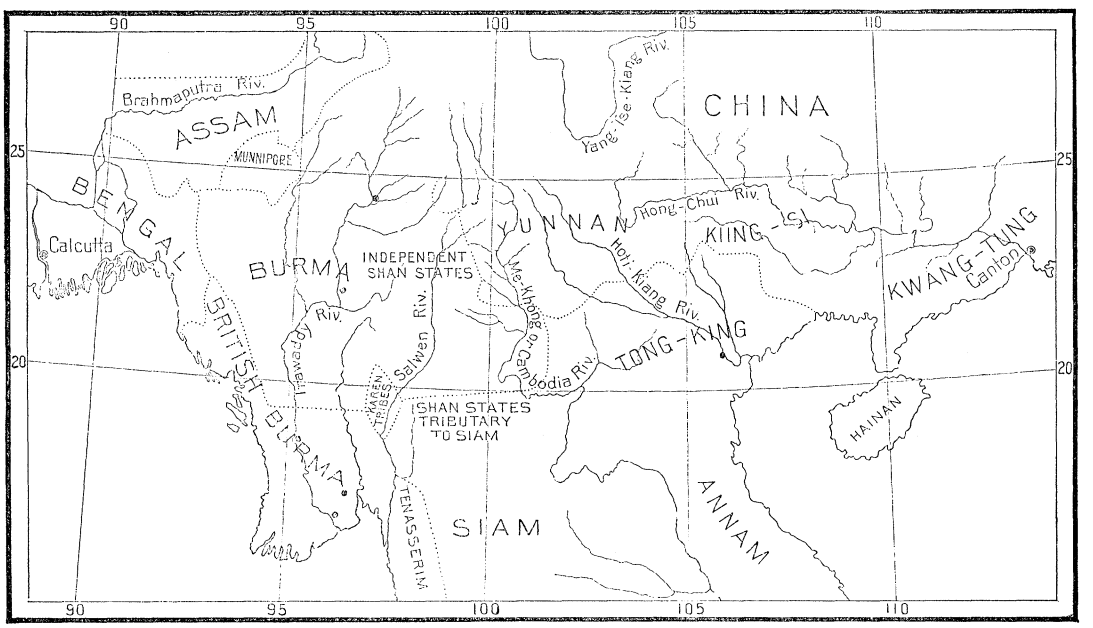
THE BURMAN DISPUTE.

THE Bombay-Burma company, a British corporation having very important interests in Independent Burma, was ordered by the Burman government to pay twenty lacs of rupees (about $1,000,000) in respect of their forest leases. The company replied that it was unable to pay such an enormous sum, and, furthermore, that no such payment was required under any reasonable construction of the grants from the Burman king. Judgment was accordingly entered against it. The company appealed to the British government, and on the twenty-eighth of last August 'the officiating secretary to the chief commissioner of British Burma' wrote to the Burman minister for foreign affairs, reciting the facts as they are here given. He then proceeded to inform the Burman minister that the British government — not the chief commissioner, not the Indian Viceroy, but the British government — 'cannot acquiesce' in any such proceedings. He asked that all further actions against the company should be suspended, and proposed that the whole dispute should be referred to a person skilled in judicial matters, to be appointed by the Viceroy of India. He closed by requesting the Burman government to 'make a very early reply' to these three questions: (1) whether the decree would be suspended; (2) whether the matter would be submitted to arbitration; and (3) whether the Burman government would agree to abide by the arbitrator's decision.

To an unbiassed observer this proposition that the government of one of the parties to a dispute

should appoint an 'arbitrator' to whose decision the other party — in this instance an independent sovereign, so far as the British are concerned — should agree to abide, even before knowing the arbitrator's name, seems to possess features as objectionable as they are novel. The Burman government did not take kindly to the idea of exposing all the secrets of Burman mal-administration to the gaze of a foreigner, even though he possessed the confidence of the Viceroy of India. A reply was accordingly drawn up, and sent to Rangoon in the most insulting way that could be devised. One sentence will show the weight which the despot of Mandalay attached to the demands of the British government. "The chief commissioner is distinctly informed," so this strange letter reads, "that on no account will there be any suspension of any order or action which it may be necessary to pass or take against the Bombay-Burma company pursuant to the judgment of the shildaw on the timber case." If the affair did not involve the lives of thousands of innocent Burmans, and also, as will presently appear, the continued trade supremacy of the English in the east, this reply of the ruler of less than four million partially-civilized and poorly-armed persons to an official letter of a servant of the Empress of India would appear simply ridiculous.

The matter was placed in the hands of Lord Dufferin, the present viceroy; and after some delay an ultimatum was sent to King Theebaw. In it three demands are made: namely, (1) that a person sent by the chief commissioner of British Burma shall be received with all honor; (2) that all proceedings against the Bombay-Burma company shall be suspended, pending his investigation; (3) that a British resident with a sufficient guard shall be accepted. If the first two demands are not conceded before a certain day, 'action will be immediately taken.' In other words, if the monarch of Burma will not submit peaceably to demands which were just in the eyes of Lord Dufferin, he will be compelled to submit to them and to become a vassal of the Empress of India. There are two sides to every question, and in the present case it must be admitted that, from a Burman point of view, Theebaw, the Lord of the White Elephant, is acting entirely within his legal rights in confiscating to his own use any thing upon which he can lay his hands. It is hardly to be expected that the English would view the matter in the same light; and it should always be borne in mind that, as a late viceroy once said, when the English are attacked in their mercantile interests, they are wounded in their most irritable point; and the present issue involves not merely the ruin of a particular commercial corporation. It is a part of the contest for supremacy in the east, which began years ago, in 1746, when the French captured Madras, and of which the end is not yet.



The first thing that strikes the eye when directed upon a map of Indo-China is the fact that all the great rivers of this region — the Hong-Chui (Long River or River of Canton), the Hoti-Kiang (Son

Tai or Red River of Tong King), the Me-Khong or Great River of Cambodia, the Salwen, and the Irawaddy, all have their sources, with the possible exception of the Canton River, in the unknown mountain regions of southern Tibet. Another noticeable feature is a spur of the Tibetan ranges, which, extending southwards between the valleys of the Bramaputra and Irawaddy, completely interrupts direct overland communication between British India and the north-western provinces of China. Another important fact is that throughout this whole region, excepting, of course, the great deltas of the Irawaddy and Me-Khong, the river valleys are very narrow, the remainder of the country being little else than a confused mass of hills.

There is no regular overland communication between the interior and the seaboard over which bulky goods can be transported with any fair chance of profit. The rivers must be utilized to the greatest possible extent, and it is a singular fact, but a fact nevertheless, that only one of these five great rivers is capable of being navigated with profit by steamers of a suitable size. The Canton River abounds in rapids and difficult navigation, and at the end of his tedious boat journey the trader is still far from the coveted tea mart of Puerh in southern Yunnan, — a mart at which the best tea grown in China, the so-called Puerh tea, is distributed. The Son Tai, or Red River of Tong King, at first seemed to offer a solution of the problem; but on further investigation it has proved to be filled with rapids, and to run through a wild and savage country sparsely inhabited by hostile tribes; and, as every one knows, the French have found, at the cost of much blood and treasure, that Yunnan and Kwang-Si are as far off as ever. The Me-Khong, owing to its length alone, is obviously out of the question, while the Salwen is navigable for less than one hundred miles. The last river on the list is the great Irawaddy, which, rising in the unexplored fastnesses of Tibet, flows in a general southern direction, by Bamo (at the head of navigation), by Mandalay (the present capital of upper Burma, and incorrectly spelled Mandelay in our map), by Prome (at the end of the only piece of railway in either Burma), and by Rangoon (the capital of the British Province of Burma, and the seaport of the Irawaddy. Strictly speaking, Rangoon is on the Rangoon River; but as the whole country between Cape Negrais and the Salwen is one vast alluvial plain, in which the Irawaddy, Rangoon, Pegu, and Sittang intermingle in the most reckless confusion, it is not improper to speak of Rangoon as situated on the Irawaddy, with which it is in direct communication by a delta branch of this great river. Eight hundred and forty miles above the sea, Bamo (pronounced Bamaw) stands at the head of navigation, and only fifty miles away in a straight line is the Chinese frontier. The Irawaddy is thus the key to the trade of this part of the world, and the valley of the upper Irawaddy is Independent Burma. Can we wonder, then, that the English nation welcomes the excuse which the recent suicidal action of the Burman government has given it for taking possession of what will undoubtedly prove to be one of the most important trade routes of the world.

It may be said that I have overstated the desires of the English in this matter, and, to guard against any such reproach, a few sentences culled from the leading editorials of the London *Times* for October 15 and 17 are here introduced. The first is from the issue of the latter date, and is as follows: "It is as a high road to China that upper Burma is most valuable to us, and this road we shall now insist on keeping open, at any cost." The other quotation is somewhat longer, but is still more to the point: "Upper Burma is a strip of country interposed in the direct line between the eastern provinces of India and China. It is most important for our trading interest that the route between the two empires should be open. The establishment of another European influence [French?] in upper Burma could be regarded by the English only with dismay. But with the trade routes in English hands would come, not only trade, but, in time, not an alliance, but a friendly understanding between England and China,—two countries whose interests are identical, and whose enemies [Russia and France?] are the same." At first sight it may seem strange that such a valuable trade route should have remained unknown and closed to Europeans for so many years, and should have almost ceased to be used as a trade route within the past two decades. Yet such is the fact, though the causes of this strange development are not far to seek, and are to be found in the character of the races which inhabit upper Burma and south-western China.

With the exception of the regions surrounding the poles and a small portion of central Africa, there is probably no part of the earth's surface about which geographers are so ignorant as they are of the topography, hydrography, and ethnography of this part of Indo-China lying between the twentieth degree of north latitude and the sources of the Bramaputra and Yang-Tse-Kiang. It is known, however, that three routes lead from Bamo to Yunnan, and they have been traversed repeatedly in the last few years by Europeans, and will be found described in the books.

The Burmans are the ruling race of Burma, and, if we had space, would receive more than a passing

notice. As it is, however, we can only point out, that, separated as they are by lofty mountains, the Indians and Burmans have little in common; but the Buddhist religion, and the Buddhism of Burma, are said to differ in many essential points from that of India. Then, too, the caste distinctions of the one country do not obtain in the other, and, finally, the system of land tenure and administration in vogue in this part of the land of the white elephant, is unique in the institutional history of mankind. Any one interested in the subject is referred to a work in two volumes, entitled 'The Burman,' by an author who conceals his identity under the euphonious pseudonyme of Shway Yoe, and to the late Captain Forbes's invaluable work on British Burma.

If the Burmans are the rulers of the country as a whole, their hold on the tribes living between Bamo and the Yunnan frontier is very slight. On the hills nearest Bamo live the Kakhyens, a savage and godless people, who worship 'nats' and tyrannize over travellers. They are few in numbers, and, with the English once in possession of Bamo, could offer little opposition. Intermingled with them in Siam, and spreading thence to the south well into Siam, and to the east beyond the Chinese frontier, live the Shans, who are much more capable of civilization than the wild Kakhyens, and even now lead a peaceable and well-ordered life. The Shans seem to be related to the Siamese rather than to the Burmans, and, indeed, the southern tribes are tributary to Siam. So, too, in theory, are the Burman Shans tributary to Burma. In practice, however, it is not so, and the power of the Burman government, which grows rapidly less as one gets away from the despot's palace in the centre of Mandalay, becomes nothing long before the Yunnan frontier is reached. Indeed, some Shan tribes are reported as paying a nominal tribute to the rulers of both countries, while obeying neither.

Passing over the boundary, we come at once to that portion of Yunnan which for eighteen long years was the scene of the Mohammedan revolt against the Chinese yoke. At last, in 1874, this rebellion of the Panthays, as the Mussulmans are called in Yunnan, was finally crushed. In the course of the eighteen years of civil war, however, the country had been in great measure depopulated, its agriculture ruined, and its commerce paralyzed. Now, again, caravans are reported as arriving at Bamo. This part of our globe is so rich in the products of its soil, in the mineral wealth lying within easy reach, provided the cost of transportation was not so great, and in its splendid forests of teak and other hardwood trees, that there seems no doubt but that the first nation to penetrate to the interior, and build the necessary roads and railways, will for many years monopolize the trade of a large portion of Farther India. EDWARD CHANNING.

AESTIVATION OF MAMMALS, WHAT IS IT?

THE occurrence of æstivation, or something considerably like it, is a possible mid-summer feature of the animal life in southern New Jersey; and yet I find no reference to the subject in any work descriptive of the habits of our fauna. What is æstivation? In Stormonth's dictionary, the definition is as follows: the sleep or dormancy of animals during the hot or dry season in warm climates; the analogue of hybernation in cold regions.

The condition of certain mammals, as reported to me during the summer of 1884, brought the subject prominently to mind, and I found that in past years I had made many memoranda concerning unconscious animals; but the full significance of which I did not, until recently, recognize; and indeed, I may not now correctly interpret the facts.

The following is an instance of the supposed occurrence of æstivation, or something closely akin to it:—

A family of white-footed mice was found in an exposed position in an open field; the nest being made of a few leaves and some thistle down, under an old tin pan, the bottom of which had nearly rusted away. When these mice were taken up—and they were handled with great care—they were found to be soft and warm, as when in full vigor, but gave no signs of life. The female mouse and her three young, which were more than half grown, constituted the family. As there was no apparent cause for the death of the mice, I determined to investigate the matter very carefully. One of the young was pricked on the ear with a needle, when it flinched slightly. The others were similarly tested, and all gave evidence of life to the same extent. Carrying these mice to a shady spot, and placing them in a comparatively cool position, they regained their ordinary activity in about seven hours; the process not appearing to be as gradual as it really was, but resembling closely the awaking from an ordinary sleep. They were then replaced in their nest in the field, which they promptly abandonded, but returned thereto, in the course of the next day. Three days later, these mice were found in precisely the same condition. Time, noon; thermometer 106° F. These mice were taken directly to a cellar, forty-two degrees cooler than the open field, and the sudden change proved too great a shock. The young died in one