

to furnish evidence of having passed either Part I of the examination for the Diploma of Public Health (Sydney and Melbourne), or of having attended laboratory instruction for at least one month at the university selected. The subjects for examination are: Tropical pathology and parasitology, tropical and applied bacteriology, tropical hygiene and sanitation, tropical medicine. Candidates eligible are qualified medical practitioners registered in one of the States of the Commonwealth. They must produce certificates showing that twelve months have elapsed since qualifying in medicine, surgery, and midwifery, and of having since attended a three months' course of study and practice in tropical pathology, parasitology, bacteriology, hygiene and sanitation, and in tropical medicine. This should include three months' lectures, demonstrations and laboratory work at the Australian Institute for Tropical Diseases, and three months' clinical work at the attached hospital at Townsville. An illustrated description of the Institute was published in our issue for August 30th, 1913, p. 557.

THE WORKING POWER OF THE WHITE MAN IN THE TROPICS AND THE ELECTRIC FAN.

By LEONARD HILL, M.B., F.R.S.,

Professor of Physiology, London Hospital Medical School.

WHILE it has been decreed by the Australian Government that Australia shall be a white man's land, the decree is vain if it run counter to the laws of Nature. In Northern Australia the conditions of the atmosphere are tropical, and a very high wet bulb temperature pertains there through several months of the year.

Evolution has settled the dark-skinned man in the tropics, and the white in the temperate zones of the earth. The difference between the skin of the white and black man may be seen on holding the hands of either before an arc lamp, or putting a glow lamp in the mouth of either in a dark room. Far more light penetrates the hands or cheek of the white than of the black man. If we examine with a pocket spectroscope a piece of skin taken from a white man we find red, green, and blue rays pass through, while a piece of black skin lets through red rays obscurely, and little more than these.

Dr. William Lowe, in an interesting paper read before the Royal Society of Victoria, pointed out that if melanin, obtained from an ox eye, be mixed with water and spread on a sheet of glass, it will prevent the sun's rays, concentrated by a burning glass, from passing through and firing a match held beneath. The light rays are absorbed by the pigment and converted into heat rays which warm the water, and the heat is lost in evaporation. The pigment of the black skin lies in the deepest layer of the epidermis; by absorbing light and converting it into heat it increases the transpiration of water, and at the same time protects the blood in the subjacent vessels. Dr. Lowe suggests that the absorbed heat excites the terminal plexus endings of the cutaneous nerves, and provokes sweating. The black man so protected, though with shaven head and naked body, can do field work in the tropical sun and enjoy life. He wears no clothes, so as to allow the free play of convective currents, and takes full advantage of every wind that blows.

The white man, on the other hand, is unprotected from the actinic rays. These, penetrating his unpigmented epidermis, are absorbed and converted into heat by the pigment of his blood. The blood in the cutaneous vessels is thus warmed, and the heat carried by the blood to the viscera. To protect himself the white man wears clothes, selecting white or khaki, which most reflect and scatter the actinic rays. He thus surrounds himself with a layer of stagnant air confined in his clothes, air with a relatively high wet-bulb temperature, which retards the loss of body heat. The white man's body heat regulating mechanism is therefore less efficient, more energy of the heart, etc., is spent in him in the maintenance of an excessive cutaneous circulation and perspiration. To persuade the black man to wear clothes for the sake of appearance or conformity with the white man's customs is to make him run counter to the laws of Nature.

The white man takes refuge under umbrellas, in verandahs, etc., screens himself from the sunlight. The heat

and moisture of the stagnant air brings the blood into his skin. The blood flow through the arm may be ten and even twenty times greater when the atmosphere is hot and still than when it feels cold. His skin temperature rises up to body temperature, and there is established a uniformity of cutaneous conditions. He needs the play of wind and varying temperature to stimulate the great field of cutaneous nerves and keep him vigorous and happy. The white man is disinclined for muscular work under such conditions because he is impelled to keep his heat formation down. He keeps quiet, and in consequence his metabolism is lessened, he ventilates his lungs less, uses less oxygen, his abdominal viscera are not efficiently massaged by deep breathing and body movements, and his blood is less well circulated. He needs less food, has less appetite and digestive power, and so is likely to suffer from the absorption from his bowel of the products of bacterial fermentation. Altogether he runs at a low plane, and feels the need of stimulant. Fortunately he now can gain in house or office the greatest relief from punkahs and electric fans. The electric fan has revolutionized the condition for civilian work in the tropics. The whirling air drives the stagnant atmosphere from his garments and brings him comfort and working power indoors. Fans can be obtained which reverse the direction of the wind and periodically vary the uniformity. Exposed to the sun, however, the conditions of his skin are abnormal, and he cannot be comfortable or happy doing field labour in the tropics. His training and innate energy may drive him through a field task, or a forced march, but he escapes from the climate as soon as he can. If he stops, health and morality tend to diminish, the happiness of congenial work and family life are not his reward. The white man can be the organizer and overlooker, and the handicraftsman working in fan-cooled buildings protected from the sun, but he can only live at the expense of the dark-skinned races whose field labour is exploited by him. Thus the white man is the black man's burden. How far important outdoor labour could be made more possible for white men by the use of powerful fans is a matter for the engineer to determine.

The following is taken from an Australian paper which reached me last year:

"According to Mr. F. Allen (Mayor of East Fremantle), who has just returned from a trip to Darwin, the Commonwealth's white Australia policy, so far as the Northern Territory is concerned, is doomed to failure. This represents not only his own view on the matter, but that of all the whites with whom he came in contact at Darwin. The climatic conditions combined with the high cost of living make it practically impossible for a white community to thrive there. . . . From what he could gather there was a consensus of opinion that to develop the country there should be a system of cheap indentured labour. . . . Only recently a wealthy syndicate obtained concessions inland, and advertised for men in Perth. It was found impossible to get men under £10 a week, while some demanded £20. The consequence was that the syndicate had to abandon its scheme."

MAKAN SIRIH.

By W. B. ORME, M.R.C.S., L.R.C.P.,

Sandakan, British North Borneo.

OVER the whole of the Eastern Archipelago the habit of *makan sirih* is found widespread among the numerous nationalities of these regions.

Sirih is the Malay word for the betel vine, the true designation of the plant being *Piper betle*, belonging to the natural order Piperaceae; to which also belongs *Piper nigrum*, the plant from which is collected ordinary black table pepper.

To those living in Borneo, or in fact anywhere in the Far East, the habit of chewing betel is more or less familiar. It is not confined to the Eastern Archipelago, for it is a common practice in India, especially I believe in the central provinces and Madras, where it goes by the name of *pan-supari*. The word *pan* is the Indian name for the betel vine, and *supari* for the other chief ingredient of the masticatory, namely, areca nut. The betel vine is as a rule grown in special gardens, surrounded by plantains to protect it from the winds; the vine is trained on poles or sticks, much in the same way as scarlet runners are grown at home. It grows best in a shady situation, and if

this is not available it is usual to protect it artificially by attaps or mattings. The leaves of the plant are broadly ovate, with a glossy upper surface, and possess a warm aromatic and somewhat bitter taste; those produced by the second year's crop are most prized by the sirih eater; the vine will, however, last for some twenty or even thirty years.

Natives of India use the heated leaves to apply to the chest in the bronchial affections of children, and I notice that the plant has been included in the addendum to the *British Pharmacopoeia* of 1900, probably for this reason.

The areca nut is the fruit of the *pinang*, the palm from which the Prince of Wales Island gained its Malay name. This palm is very common in the Far East and along the Malabar Coast of India, often growing to a height of from 30 to 45 ft., surmounted by a graceful head of leaves. It is generically classified by Tommy Atkins in Kipling's poems as belonging to "them feather-eeded trees."

When in flower the palm throws out a large, many-branched spadix of both male and female flowers of a light yellow colour; at about the fifth year it generally begins to fruit, a bunch of its berries weighing some 20 lb. in a good year. The white endosperm of its berry is of stony consistence, and is ruminated by the dark seed coat growing into it and giving it a mottled and veined appearance.

The method of preparing and using the masticatory varies in different regions, but the usual process is somewhat as follows: The selected leaf is first laid flat in the palm of the left hand, with its glossy surface upwards, and is then smeared with a semi-solid mixture of lime paste; this is called *kapor*, the Malay name for lime, which is often prepared by burning sea-shells.

A young and tender pinang nut is now chosen, and a few small slices removed with a curious double knife, somewhat resembling a pair of ordinary nut-crackers, with sharp blades directed inwards. Most of these knives are made locally, and are of various shapes and models. One or more of these sections is dropped into the centre of the lime-smeared leaf and a little gambir added in the solid form, or as a paste applied by a piece of stick. Gambir is our black catechu, obtained as an extract from the wood of *Acacia catechu*, a delicate-leaved tree belonging to the natural order Leguminosae. This accomplished, the leaf is folded over its contents in the form of a small triangle, and is ready for chewing.

In certain localities other ingredients are added to the masticatory, such as tobacco, cardamoms, cloves, etc.; the latter are often used not only for their flavour but to act as a kind of button when pierced through the leaf, preventing the package from unfolding.

Now what is the object of chewing this abomination? The saliva soon turns a brilliant crimson resembling blood, and has more than once been mistaken for such by young doctors soon after their arrival in the East. The lips, gums, and teeth became stained, and if the habit is continued for long the teeth gradually attain a jet black, and according to our European ideas do not greatly enhance the personal beauty of the chewers.

The blood-red colour resulting when the mass is chewed has been said to be due to the action of the lime on the tannin in the areca nut; possibly this has something to do with it, as I find that lime and tannic acid give a purplish-blood colour. The full black colour, however, is not produced unless the gambir is used in conjunction with the areca nut, and it may well be that the coloration is simply brought about by the intensification of the natural colouring matters by the alkalinity of the lime.

The poorer classes generally carry the paraphernalia wrapped up in a piece of cloth, or in a sort of cloth purse tied round the waist. In their houses they more generally use some kind of a box with several compartments for the different constituents. The more wealthy use boxes of brass, copper, or silver, many of which are magnificently engraved and among the finest examples of Malay art.

The physiological action of betel is mildly sialagogue, allaying thirst by the increased flow of saliva. The alkaloid arakene which the leaf contains appears to have the effect of assuaging hunger and of warding off bodily fatigue, so that long hours of work can be accomplished though little or no food be taken. In the respect of alleviating bodily fatigue "makan sirih" appears to fill

the same part as coca chewing among the natives of South America, chiefly in Bolivia and Peru. The coca leaves are produced from the *Erythroxylum coca*, which first became known in Europe in the early part of the seventeenth century, and it is from these leaves that cocaine is prepared.

Natives have informed me that "makan sirih" is an excellent preventive of malarial fever; as to whether this is so to any extent I am not prepared to vouchsafe an opinion, but certainly it is no uncommon occurrence to see sirih eaters suffering from the disease with parasites easily demonstrable in their blood.

It would have been mere arrogance to write on such a subject without personally testing the masticatory. Having obtained, therefore, the necessary ingredients from my orderly, I smeared my sirih leaf lavishly with the lime paste, and, cutting chunks of pinang and gambir with my nail scissors, dropped them in and folded the leaf. The first sensation on chewing this rather cumbersome package was a somewhat bitter taste accompanied by a pleasant warmth. The warmth increased so rapidly, however, that had I not been of a rather determined nature I should probably have ejected the mass over the balcony without delay. However, I hung on for the sake of science. Three minutes passed, during which the warmth developed into heat, and then into actual pain, culminating in intense suffering. Quickly I expectorated the unholy morsel, but, alas! matters were by no means at an end; my tongue swelled so that it felt like a huge potato in the mouth, and the pain became intolerable, causing me to run round the house like a circus horse, halting incidentally at the ice-chest for a cooler.

Apparently the cause of all the distress was the application of too much lime and the use of an amount of the masticatory which only a hardened habitué would have dared to tackle. Let "Festina Lente" be the motto as regards "makan sirih" of any who wish to make a trial. Personally I am sufficiently altruistic to trust my worst enemy may never undergo the agony that I did.

My first "makan sirih" has been entered in my diary, and falls into the same category of experiences as my first yachting cruise and my first cigar.

REPORT OF THE MEDICAL OFFICER TO THE LOCAL GOVERNMENT BOARD FOR THE YEAR ENDING MARCH 31, 1913.

(Continued from page 252.)

II.

Incidence of Plague, Cholera, and Yellow Fever.

DR. BRUCE LOW contributes the usual reports on the diffusion of plague and cholera throughout the world. These reports do not contain very much that is new save that there is some indication that the population of India are now not quite so antagonistic to hygienic reform as previously was the case.

A report on the progress of yellow fever has been added for the first time owing to the renewed importance of this disease in view of the possibility of its carriage to Asia from the Panama Canal. At present Asia is free from the disease, but the *Stegomyia fasciata* abounds in some ports, and there are grave reasons for fearing that once introduced the disease will rapidly become established. On reading this report one is again impressed with the immense debt which humanity owes to the United States Army Medical Service.

Typhoid Fever.

The three reports by inspectors of the Board on epidemics of enteric fever at Strood, Shepley and Ringwood are all carefully worked-out examples of problems in modern epidemiology. The Strood epidemic appears to have been definitely traced to contamination of the public water supply by infective material soaking through fissures in the chalk; the Ringwood epidemic to children drinking from an infected brook, and the Shepley epidemic was traced to a carrier, who was subsequently found to be the cause of a previous epidemic. Although this one case had caused at least 60 cases of enteric in a few years, the county and borough councils concerned have refused to entertain any proposal for granting to her a small allow-