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.,

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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.,

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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