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**Physiology of Acclimatization and
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Akihito Suzuki (Keio University)

Introduction

In his Beyond Good and Evil, a work of trenchant criticism on traditional morality published in 1886, Friedrich Nietzsche suggested that a new type of human body was emerging in Europe in the late nineteenth century.

[Behind] all the moral and political foregrounds pointed to by [democracy], an immense PHYSIOLOGICAL PROCESS goes on, which is ever extending the process of the assimilation of Europeans, their increasing detachment from the conditions under which, climatically and hereditarily, united races originate, their increasing independence of every definite milieu, that for centuries would fain inscribe itself with equal demands on soul and body,--that is to say, the slow emergence of an essentially SUPER-NATIONAL and nomadic species of man, who possesses, physiologically speaking, a maximum of the art and power of adaptation as his typical distinction.
[original emphasis]

In this passage Nietzsche referred to a problem of "acclimatization", a living being's adaptation to a climate which was not one was familiar to. Acclimatization was a subject studied intensely and extensively in medicine, biology, agricultural science, animal husbandry, and other related sciences. Against the backdrop of Imperialism and a large-scale movement of people, plants, and animals around the globe, scientists were keen to study whether a species of plant, livestock, and man, was able to adapt to and flourish under a new climate. Sciences of acclimatization bolstered Imperialism, through studying the components of the ecosystem which underlay the new pattern of the distribution of people and other living species around the world. Acclimatization was a subject of scientific research which provided the core of "ecological imperialism", to use an apt phrase of Alfred Crosby. Adapting a living being, be it a plant, animal, or man, was desirable and necessary for the new ecological order of globalization.

Nietzsche had a rather different view of acclimatization of human species. The acquisition of physiological adaptability, which was undoubtedly regarded as an asset for the colonization of different climates by the Europeans (and later by the Japanese), was far from something to celebrate for the German philosopher. For Nietzsche, the separation from the climate of the origin of the race meant that European races were losing the cultural and spiritual vitality deep-rooted in their respective birthplaces. Physiological flexibility denoted mediocrity and lack of unique character of the race. To overcome this modern tendency for the body of people to become that of useful but indistinct herd animals, Nietzsche famously claimed that man must use will to power and go beyond the destiny dictated by physiological/material aspects of man.

Nietzsche was of course not alone in thinking about culture and civilization in terms of the climate, the body, and the race. His vision was to be taken up by numerous early twentieth-century critics of modern materialist civilization, from Spengler to the Nazis. Nietzsche was also thinking within a long tradition since Hippocrates via Montesquieu, which conceptualized the relationship between the climate and culture through the former's influence upon the body. As the immigration of the Europeans to places of different climates accelerated in the age of Imperialism, Western medicine and biological sciences were increasingly preoccupied with the question of acclimatization, or the adaptation of the immigrants' body to new climates, as well as the question of the racial difference. Works of the historians of colonial medicine, most notably those of Philip Curtin, Mark Harrison, Warwick Anderson, and David Livingstone, have demonstrated the vital role played by the climactic and environmental medicine in the making of colonial policies, the most visible legacy of which was the creation of hill stations, which acted both as spatial apparatuses of racial segregation and as the site that enabled the European colonizers to live in a climate which was similar to that of Europe.

Harrison and Anderson have provided us with the accounts of two major shifts in the discourse of climactic medicine and acclimatization, in the context of early nineteenth-century British India and early twentieth-century Tropical Australia respectively. Harrison has maintained that attitude to the climate in British India changed dramatically during the course of the nineteenth century: from the

mid-nineteenth century, British doctors in India increasingly expressed pessimism toward European adaptability to the climate of India. Harrison has attributed this shift to the rise of the notion of the race, which implied that the bodies of difference races were radically and incommensurably different and that the benign effect of adaptation to a different climate was not enough to bridge the fundamental gap between the European and the Indian bodies. The idea of Darwinian evolution further supported this pessimism: if the Indian bodies were produced through centuries of interaction with their environment (including fauna and flora for food) and the climate, there was little hope for the British bodies forged in the mild climate to adjust to the Indian soil in a few generations.

In contrast, Anderson has found a new optimism for acclimatization in Tropical Australia at the beginning of the twentieth century. Australian scientists in the early twentieth century dramatically changed the medical attitude toward the European immigration to tropical Queensland from pessimism to optimism. The key to this change of attitudes was the new science of infectious diseases. Newly established bacteriology and parasitology indicated that the threat to the white settlement came less from the hot climate itself than from the pathogens, vectors, and the indigenous people, who were feared to secretly harbor the pathogens due to their racial and hereditary immunity to tropical diseases. If one was able to exclude the threat of the pathogens, the new orthodoxy in Australian tropical medicine prophesized, the tropics of Australia was open to white settlement. The policy of racial segregation in tropical Australia was thus the combination of the prevention of the tropical diseases and the realization of the "White Australia". Anderson has also discovered that Americans in the Philippines expressed a similar optimism for the American settlement in their new colony, encouraged by their dramatic and much feted control of malaria and yellow fever in the Panama Canal.

Works of Harrison and Anderson suggest that in the early twentieth century acclimatization had become a highly charged concept with competing theories, concerns, hopes, and fears, inseparably interwoven in the building of an empire or a nation-state stretching over different climates. This paper will change both the time-frame and geographical focus and examine the theory of acclimatization in the Japanese empire the 1930s and 40s. As the Japanese Empire expanded towards the South (Nanpō), and integrated

South East Asia and islands in the Pacific to the Great East Asian Co-prosperity Sphere, Japanese scientists vigorously pursued research into acclimatization in the 1930s and 40s. These researches were incorporated into the discussion of policy of the Japanese immigration to the tropics.

I think there are two important issues which have not been dealt in depth and in detail by Harrison, Anderson and other historians of colonial medicine of acclimatization. The first is the role played by the physiological laboratory experimentation in the making of Japanese medical discourse of acclimatization in particular and imperial medicine in general. Anderson has emphasized the role of bacteriology and parasitology in the making of tropical medicine in Australia and the Philippines and has perceptively pointed out that these disciplines contributed to the new medical framework which exonerated the tropical climate as pathogenic and instead blamed the indigenous people as the dangerous "other" who harbored deadly pathogens. In contrast, I would like to argue, what characterized the Japanese colonial medical discourse in the 1930s and 40s was not so much as the pathology of the other as the physiology of the normal and the construction of the self through the science of the body.

Physiology played an important role partly because of a simple reason: a physiologist was at the centre of the Japanese discourse on acclimatization. The figure was Kuno Yas, an eminent physiologist who taught at the Medical School of Manchuria and the Nagoya Imperial University, who became a candidate for Nobel Prize twice (in 1936 and 1938) for his work on human perspiration. In 1941 he received the Onshi Prize of the Japan Academy, the highest honour endowed to academics in Japan. Kuno started his pioneering research into human perspiration during the 1920s and early 30s, when he was a professor of physiology at the Medical College of Manchuria. His research culminated in *Physiology of Human Perspiration*, a monograph he published in 1934 in English from a medical publisher in London to become a standard work for international researchers. At this stage, the subject of tropical acclimatization was hardly visible in his research, although many of the basic ideas which he later developed into a theory of acclimatization were already present. Things have changed dramatically when he resigned the professorship in Manchuria in 1935 and came back to Japan to assume briefly a post of lecturer at Kyoto Imperial University and then a professorship at Nagoya Medical School (soon to be Nagoya Imperial

University) in 1937. Perspiration was conceptually transformed into the body's response to the heat of the environment. The physiologist working in isolation in the laboratory in Manchuria was quickly transformed into a powerful organizer of research of tropical acclimatization conducted as a basis of the national policy of immigration. Kuno was in command of a large amount of research fund provided by the state, sat in important committees, and his disciples were conducting research in various regions in the tropics. Both the Japanese translation of his English work by one of his disciples and Life in the Tropics, his book for popular audience, appeared in 1943, the heyday of the national discussion on the immigration to the area of South East Asia and islands in the Pacific occupied at the early stage the Pacific War. Kuno's research during this period was at the heart of the medical science for the construction of the Great East Asian Co-Prosperity Sphere.

As is evident from the brief account just mentioned, Kuno's research was less about the pathogens or dangerous other of the tropics than about the body of the Japanese immigrants. Through putting the Japanese body, which served as the somatic basis of the racial self, at the centre of his research, Kuno's physiology was integrated into the heated question of the identity of the Japanese people during the wartime. Partly because of the conjunction made between the physiology of the self and the discourse of racial identity, Kuno's theory became a centre of intense dispute over immigration policy and, ultimately, the identity of the Japanese.

Prehistory: Okabe Yōzaburō

The Japanese discussion of acclimatization reached its peak in 1942 and 1943, when the English, American and Dutch colonies in South East Asia were occupied by the Japanese army and opened up for mass immigration of the Japanese. This brief but intense discussion was preceded by a small build-up of research and discussion since the early twentieth century. The large-scale colonial medicine in sub-tropical Taiwan, with its Imperial University and facilities for research at Taipei, had provided an epicenter of tropical medical research for Japan, as has been shown by the works of Wataru Iijima and others. Former German territories in Micronesia which became the League of Nations Mandate after the WWI, provided another basis

for the development of tropical science and medicine, as Sakano Tōru's work has shown. Also in Singapore and other major cities in South East Asia, Japanese doctors practiced medicine for the Japanese immigrants and office-workers in those areas, and some of these practitioners reported what they observed in the Japanese patients.

Okabe Yōzaburō was one of such doctors, who practiced medicine for the Japanese immigrants in Dutch East Indies. His Nettai Eisei [Tropical Hygiene] published in 1925 showed both the potentials and limits of Japanese medicine on acclimatization at that time. Okabe's publication was prompted by a situation which he believed necessitated Japanese immigration to the tropics. The situation was product of domestic and international issues: the overpopulation of the mainland Japan could be solved only through immigration; the policies of U.S.A. and Australia to limit the immigration of colored races closed an important channel of Japanese immigration; immigration to China was becoming difficult due to the protest against Japanese imperial policies in China (and Korea, one might add), the most visible image of which was the Twenty-one Demands in 1915. Under such a situation, Okabe maintained, only South East Asia could absorb the surplus population of Japan. The problem was, according to Okabe, the tropical regions were notorious for being insalubrious for European immigrants. Okabe's own experience in medical practice for the Japanese immigrants confirmed that this was also the case for the Japanese: many white-collar male workers at tropical branches of Japanese companies fell ill soon after their arrival and were forced to return. Their wives, too, became neurasthenic and hysteric. Few could stay for a longer period on the job, which was a considerable waste of human resource for the companies. The clinical experience of Okabe was thus far from promising. Although common sense or wishful thinking might suggest that the Japanese would adapt to the climate of the tropics better than the Europeans, there were few solid evidence that would have boosted such optimism. Although Japanese immigration to considerably warmer Taiwan was successful, Taiwan was not a real tropic, as Okabe reminded. The Chinese were flourishing in the South East Asian cities, but they were originally from the sub-tropical Southern regions of China, considerably warmer than the mainland Japan. In the end, Okabe concluded that the Japanese would not be able to engage in physical labour in the tropics and had to limit themselves to supervising the

indigenous manual labourers. This was exactly what many British doctors working on tropical hygiene had been suggesting. Okabe's book thus reveals the difficult situation which faced Japanese medicine in the tropics in the 1920s: although the social and political demand for the study of acclimatization was great, the Japanese medicine produced little beyond common-sense, wishful thinking, and what had been already maintained by the European doctors of tropical hygiene.

Kuno Yas and Physiology of Acclimatization

Around the same time when Okabe published his rather primitive medical treatise in response to the post-WWI international tightening of Japanese immigration, Kuno Yas, a young professor of physiology of the Medical College of Manchuria, started to develop a sophisticated academic research into human perspiration, which was to become a pillar of Japanese immigration policy in the 1940s. I don't go into details about the technical problems in Kuno's research, but point out only two characteristics. The first is that it was an academic project, supervised by the professor and conducted by an army of students and research assistants. During his professorship at Mugden, Kuno and his disciples published more than forty papers on perspiration in academic journals (almost all of them published in *Manshu Igaku Zasshi*). Unlike Okabe's work, which was essentially based on the experience of a single doctor, Kuno's research was a collective large-scale project. Secondly and relatedly, Kuno's research represented the academic turn of Japanese medicine from the 1910s. The Japanese academic medicine grew remarkably between 1910 and 30, during which time the number of medical school grew from two to seventeen. These medical schools were equipped with facilities for research and experimentation, which enabled the medical professors and the senior students to conduct sophisticated laboratory experiment. To measure the exact amount of sweat, Kuno devised many instruments for precise measurement, the largest of which was the perspiration chamber. [Figures 1 & 2] This facility allowed the researcher to precisely measure the sweat of the subject under changing temperatures. To build the instrument, Kuno could avail himself of the service of Kōzaburō Mizukura, an engineer specializing in the construction of medical instruments for the Manchurian Medical School. Kuno's research was thus

based on precise measurement through specialized instrument, embodying the prevailing ethos of scientific medicine at that time.

The first major conceptual breakthrough was made in 1935 by Ogata Korehiro, a disciple of Kuno at Mugden. Ogata discovered that there were two kinds of sweat glands in humans: active glands and non-active glands. Although these two glands were anatomically indistinguishable, only active glands were responsible for sweating, while non-active glands never secreted sweat. [Figure 3] In other words, Ogata's discovery prepared a departure from the anatomical paradigm of racial difference and provided a vital building block for a physiological study of racial difference, by showing that physiological functions of the two kinds of glands were fundamentally different, despite their structural identity.

Kuno left Mugden in 1935. He taught briefly at Kyoto (1935-37) and then at Nagoya (1937-55). At both universities, Kuno received an abundant amount of research money: he was one of best-funded medical professor in pre-war Japan. Kuno also attracted many senior research students from institutions other than his own department or university. Indeed, when he was appointed to a medical member of Committee of Academic Research of Japan (Nihon Gakujutsu Kaigi), he encouraged free movement of researchers between universities and departments.

One of those researchers he attracted from a medical school that was not his own was Kawahata Aikō of Navy Medical Service, who made a crucial development to develop Kuno's study of perspiration into the theory of tropical acclimatization. Kawahata graduated from the Navy Medical School, studied under Kuno at Kyoto Imperial University. After his mastery of Kuno's techniques of experimentation, he went back to the navy and conducted a series of experiments in 1938 in the Philippines. One experiment was the study of racial difference of the number of the active sweat glands. The result was quite interesting. The native Japanese possessed a larger number of active glands than the white (the Russians) but a smaller number than the Filipinos. This finding confirmed the common-sense view that the Japanese are closer to the tropical race than the whites are. More importantly, the Japanese who were born in the Philippines were endowed with almost as many active glands as the native Filipinos, while the number of the glands of the Japanese immigrants to the Philippines was almost the same as the Japanese. Birth in the tropics, not stay there, equipped the

people with a large number of the sweat glands to cope with the heat.

Another set of experiments was conducted by Kawahata (and other disciples of Kuno) in the Philippines, Thailand and Micronesia, again exploiting the high mobility of a navy doctor. These experiments tried to establish the racial difference of the sensibility of the central nervous system to the stimuli of heat. It also measured the difference among Japanese immigrants of different length of stay in the tropics, the shortest having stayed for 14 days, the longest for 30 years. Bringing the perspiration chamber around, Kawahata measured the threshold of body temperature at which the subject started to perspire and compared figures among different races and immigrant and native-born Japanese. The threshold of perspiration was higher for the Philipinos than for the Japanese immigrants. The Philippine-born Japanese showed the same result with the natives of the Philippines. The experiments conducted in Thailand showed, however, the Japanese immigrants who had lived in the tropics for more than ten years showed the same threshold temperature as the indigenous people of Thailand.

These two experiments of Kawahata provided the vital building blocks for the vision of the Japanese immigration to the tropics, both explaining the present problems and suggesting a policy to solve them. The experiment on the number of sweat glands demonstrated that the Japanese born in the tropics would be able to cope with the heat better than the immigrant Japanese who were born in Japan. On the other hand, the experiment on the threshold temperature indicated that the immigrant Japanese who had stayed in the tropics long enough would acquire a central nervous system that was similar to the indigenous people in terms of its control of perspiration.

Kuno integrated these somewhat paradoxical experiments into a picture of the economy of the human body, borrowing metaphors from the contemporary economic policy of capital and control. The indigenous in the tropics possessed a larger "capital" in the form of the large number of glands. They did not perspire at lower temperature because their ability to "control" perspiration was higher. The inexperienced Japanese, on the other hand, had a smaller capital (smaller number of glands) and the weaker control (lower threshold temperature). Birth in the tropics increased the capital (the number of glands), while the long residence in the hot climate increased the ability to control (higher threshold temperature of

perspiration). The training made the subject to "use energy more economically in carrying out a certain work" by perspiring less. Kuno conceptualized the economy of the human body in terms of the changing amount of capital under different degrees of control.

It is clear that Kuno's idea of the regulation of the perspiration closely followed the language of the contemporary economic policy of Japan with increasing emphasis on wartime regulation of resources. Seen in the light of the contemporary economic policy, it is evident that Kuno's concept of a not-yet-acclimatized body of the Japanese was an embodied simile of unregulated economy with small resources, while the body of the native of the tropics corresponded to a strictly regulated economy with large resources. Kuno's metaphoric connection of the human body and the social body was constructed around the model of economic regulation. This contrasted with the concept of human body held by his contemporary physiologists in the U.S. such as L.J. Henderson and W.B. Cannon, whose concept of the human body looked to market forces to create a self-regulation in capitalist society. One should also note the way in which Kuno made the body of the natives of the tropics a template or an exemplary model. It had been a common ploy to use the contrast between the sensitivity of the delicate and civilized body of the Europeans and the insensitivity of the uncivilized indigenous body. Note well that Kuno saw *discipline* in the body of the natives of the tropics, while arguing that the Japanese body (and the European and North American body) suffered from the lack of discipline. He thus completely reversed the hierarchy of races and departed from a cultural stereotype of associating the body of the natives of the tropics freedom, license, or excessive vital activity. The natives of the tropics now became the embodiment of discipline.

In the late 1930s, Kuno's research of human perspiration was transformed into a theory of tropical immigration. Political situation was clearly behind this rapid transformation of the basic science into a guiding principle of Japanese immigration. Kuno was not alone in this aspect and other medical scientists started to play the same game of studying tropical immigration, as the war with the US looked increasingly inevitable in the late 1930s. Medical study of the feasibility of Japanese immigration to the tropics became a pressing issue, and acclimatization was one of top priorities of medical research topics adopted by the Japanese Society for

the Promotion of Science. Intensive medical research was conducted using Japanese immigrants in the tropics, as well as collecting data on the physiological indices of the indigenous population. In the summer of 1941, a team of medical students from the Taipei Imperial University studied the biometrics of Japanese schoolchildren of Bangkok. Around the same time in the year 1941, doctors from the Anatomy Department of the Medical School of Keio University conducted a similar research in Saipan. Likewise, in 1941 a medical officer of the Navy started a longitudinal research of the body weight of the Japanese immigrants to Marshall Islands, and after two years of research found that the immigrants in the dry season showed smaller loss of weight. Kuno's success seems to have encouraged other researchers to follow his footsteps and study the change of physiological indices in the tropical climate. Maeda Yoshio, a navy doctor who studied with Professor Katase Tan at the Medical School of Osaka Imperial University, employed Katase's concept of the equilibrium of acid and alkaline matters in the blood and measured the amount of carbon dioxide in the blood of marines who moved to the tropics.

With the occupation of much of South East Asia by early 1942 and the opening of a prospect of a large-scale Japanese immigration to the South (Nanpō), the topic of the human acclimatization reached its excited height: dozens of monographs on "nanpō igaku" were published; medical journals devoted special issues to the topic and organized roundtables; Taisei Yokusankai issued a pamphlet, Life in the Tropics and the Prevention of Tropical Diseases (1943), authored by no other figure than Miyagawa Yoneji, the director of the prestigious Institute of Infectious Diseases. Kuno's own English textbook which had been published in 1934 was translated into Japanese in 1943 by Kawahata as mentioned above. In the translator's preface, Kawahata emphasized that Kuno's work was so important for building the Great East Asian Co-prosperity Sphere in the Southern hemisphere. Kuno himself contributed a book to the genre of popular science on acclimatization in the tropics, Nettai Seikatsu Mondai [Problems of the Life in the Tropics] (1943). The conclusions they had drawn from Kuno's experiments was simple and clear: if the Japanese spent their infancy and early childhood in the tropics, they would be equipped with a suitable metabolic mechanism which would enable them to cope with the heat of the tropics. Even grown-up immigrants could overcome the initial difficulty by adjusting to the tropics

through longer stay.

Note well that in these works which endorsed the vision of the Japanese colonization of the tropics, emphasis was also laid on the physiological shortcomings of the Westerners as the ruler of South East Asia, whose small number of sweat glands made them misfit for the tropical climate. The high morbidity of the Europeans who migrated to the tropics was repeatedly cited as the evidence that demonstrated their inability to flourish in their former colonies in the tropics. Moreover, many authors attributed the advantage enjoyed by the body of the Japanese to the climate of Japan, particularly its hot and humid summer, which was, as many of you know too well, almost tropical. Miyajima Mikinosuke wrote succinctly: "the climate of four seasons of Japan has trained its residents to tropical climate". Japan, Chinese coast, and South-East Asia shared hot and humid summer, and the Great East Asian Co-Prosperity Sphere was thus conceived as a geo-climactic empire, to be ruled by the race that had the ability to adapt to the hot climate. The Japanese was the super-race of the world, superior in its adaptability to the tropical climate, and should replace the Europeans as the ruler of the South East Asia.

A Different View: Nakayama Hideji's Psychological Survey in Palau Islands (1941)

Wartime propaganda cherished and exploited the optimistic picture of the flexible super-race, an idealized image constructed from Kuno's experiments. There existed, however, no consensus among doctors and medical scientists upon the Japanese ability for acclimatization. Kuno himself never endorsed the euphoric vision of the flourishing Japanese empire in the tropics, retaining a cautious attitude of an experimental scientist during the war. As Kuno himself was well aware, his theory of tropical acclimatization was far from complete and there existed many logical gaps and experimental holes. Some remained skeptical about a fundamental issue: whether an experiment conducted in a physiological laboratory could be applied to the real life in the tropics. Kawamoto Kunio, a high civil servant at the Colonial Ministry, cautioned that an increased number of active sweat glands of the immigrant Japanese did not necessarily mean that they would remain healthy under a hot climate.

Views contradicting Kuno's optimism were expressed. They utilized a new research methodology of epidemiology or mass survey of the population of a region. Overcoming limitations of clinical experience of medical practitioners in foreign colonies - small sample, lack of systematic investigation, and so on - epidemiological research assumed new scientific authority and carried weight in the discussion of policies. In addition to ones mentioned above, a number of important surveys were undertaken upon Japanese immigrants in the tropical and sub-tropical colonies and revealed unfavourable pictures. A survey of 2,800 Japanese children of the primary school for the Mariana Islands conducted between 1936 and 39 revealed that they were stunted to a considerable extent. The result of a large-scale questionnaire by the staff of the Imperial University of Taipei had shown that more than 60% of the subjects felt that their work performance dropped in the semi-tropical climate. Contrary to the optimism for the effect of the "seasoning", the survey revealed that the longer their stay became, the more serious became the loss of spirits and work efficiency. In Japanese colonies in the north, mass-scale psychological surveys were conducted from the 1930s. Ishikawa Shimeji of the Institute for the Research of Education of South Manchurian Railway surveyed the intelligence of the Japanese children in Manchukuo in 1935 and 36; Tanaka Kan'ichi, a professor of Tokyo Bunrika University, received fund from the JSPS and conducted psychological tests at twenty-one sites in Japan, Korea, Taiwan, Manchuria, and China between 1933 and 36. The physical and mental fitness for labour of the adult population in Manchuria was surveyed by the Institute of Labour Research in 1942.

Building upon these experiences of epidemiological, physical, and psychological surveys of population in colonies, a large-scale survey was conducted in 1941 in the League of Nations Mandate in Micronesia. The research was funded by the Pacific Society and the major responsible doctor was Nakayama Hideji, a graduate of the department of pathology of Kyoto Imperial University and experienced in anthropological research. Nakayama surveyed both the body and the mind of the Japanese immigrants in Palau Islands, as well as those of indigenous population. He selected 2,188 subjects and investigated them in seven groups of items: 1) anthropometry of various parts of the body, 2) physical strength, 3) medical histories, 4) mental test, 5) intelligence test, 6) personality test, 7) sensory-motor

skills. Here, Nakayama was clearly following an established method of the survey of colonial population. Indeed, he utilized a testing method developed by Tanaka Ken'ichi, whose test in other colonies was mentioned above.

The summary of the results was published in 1942, in Taiheiyō, a journal of the Pacific Society. The article was an implicit but firm criticism of the optimistic views over the Japanese acclimatization to the tropics. It showed that there was nothing to congratulate about the Japanese immigrants to Palau Island. They were physically stunted and inferior in work efficiency. Their characters were often defective and they exhibited signs of mental instability, poor judgment, lack of the sense of responsibility. Especially problematic were those who had been born (from Japanese parents) in Micronesia. They were egoistic, did not show any respect to the state, and lacked in perseverance. Nakayama wrote succinctly: "those who had been born in Micronesia were Japanese only in name but they were not Japanese at all. They should be called back home and educated in Japan." In short, their mind had become very similar to that of the indigenous people. Indeed, they presented a dismal picture of the Japanese degenerating into an uncivilized race, whose mind and body were ravaged by a whole lot of harmful factors, among which excessive drinking and commercial sex were the most serious. "A picture that reminds nothing but the ruin of the Japanese race" was the strongest word Nakayama used. Nakayama painted a diametrically opposite view to Kuno's vision of the acclimatization of tropics-born Japanese, with increased active glands and more efficient use of the function of perspiration. Although Nakayama did not conduct any experiment on the function of perspiration, his findings were dismal enough for him to challenge Kuno's view that exposure to the tropical climate in early childhood was beneficial. Nakayama thought the tropics-born children should be called back home to be educated into the "real" Japanese.

Nakayama thus painted an extremely pessimistic picture of the future of the Japanese immigrants in the tropics. Small wonder, Nakayama's article was censored for its contents which might discourage prospective immigrants. Imperial Army confiscated the cast of the journal and destroyed it to prevent further publication, according to a remark of Morishima Ken'ichiro, a high medical officer of the Army at a roundtable on tropical hygiene published

in a journal in 1942. Interestingly, the Army printed the article for their use and passed fifteen copies of them to the Navy. This perhaps suggests the Army found the article of some use and having some truth. Likewise, Miyajima Mikinosuke, a professor of parasitology of Keio University and an early pioneer of malariology in Japan and Malay Archipelago, showed his endorsement of the paper by Nakayama. In a lecture delivered in July 1942, Miyajima explicitly criticized the idea of acclimatization in early childhood as "extremely reckless and out of question".

The dispute over at which age one should emigrate was not just a dispute among medical scientists with different research frameworks, but was related with a deep-tooted question of racial identity. Indeed, there lurked a fundamental ambiguity in the medical discourse of acclimatization in Japan: many Japanese were not so sure about the desirability of their completely adapting to the climate of the tropics. They did not wholeheartedly welcome the prospect of the second- and third- generation of the Japanese immigrants becoming fully adapted residents in the tropics. Weren't the tropical version of the Japanese race a degenerate species, far from the idealized race of Yamato? Weren't they indistinguishable from the indigenous and primitive people? The fear of the assimilation to the indigenous race was also intense for the Japanese who were thinking of immigrating to the tropics. Nakajima Atsushi, a novelist who stayed about a year in Palau for health reason, wrote to his wife in Japan that he would not bring his family to the tropics, after finding that the Japanese children who were born there were so similar to the natives: the lips, eyes, and hair of the Japanese born in Palau Islands were just like those of the Micronesian kids. Worse still, they were even similar in their intellect. This was exactly the picture painted by Nakayama. The anxiety of losing the purity and alleged superiority of the Japanese race loomed large in the works of tropical hygienists and lay people who thought about moving their family to the South.¹

For many Japanese people at that time, to guard the identity of the

¹ Although my research into this subject is only cursory, a similar fear was expressed also by the Europeans. Marguerite Duras, a French novelist who was grown up in French Indochina, remembered in her autobiographical novel, *L'amant* (which was turned into a film in 1992), that her mother was extremely unhappy at her children's preference for local Vietnamese food and custom and when angry scolded their children as "small, yellow, Vietnamese kids".

yamato race and to maintain the unique superiority of the Japanese was at least as important as an adaptation of their bodies to the warm climate. Regular return to home, one month in every year, and one year in every several years, would restore the Japanese character and would prevent the immigrant from being fully assimilated into the indigenous population. When Takano Rokurō, a chief preventive medical officer of the Ministry of Health, a veteran public health specialist, wrote for a journal of fishermen's association, he expressed the view of Nakayama and others in the simple and appealing language.

[The immigrants'] home and resting place should be kept in the land of Japan. Their children and old parents should stay there. One becomes a true Japanese man only when one was brought up and educated in Japan. After growing up to be a Japanese, he makes his life mainly in a workplace in the South, coming home from time to time, comes back to the native country when old and takes responsibility for the education of the children whose parent stay abroad. The origin of the Japanese race should be in Japan forever. This is how the Japanese nation will remain a superior race for ever.

At the root of the medical dispute on the acclimatization and immigration thus lay a deep ambiguity over the prospect of the acclimatization, especially when it came to mean the loss of the racial identity conditioned through the climate of the homeland.

Conclusion

This paper has examined one aspect of the medical discourse on the conquest of the tropics in the 1930s and 40s, concentrating on its physiological underpinning of the geo-climactic empire. I should like to emphasize again that the relationship between tropical medicine and colonial ideology in the Japanese Empire had a strong component of geography and climatology, based on the physiology of the human body. Unlike the British Empire or Australian colonization, the Japanese empire did not invoke the racial barrier between the colonizer and the colonized. The timing was also

important: in the 1930s, the days of the excitement of bacteriological revolution had already gone, and physiology was in ascendancy. It was through the science of the metabolic functions of the body, that Japanese medicine in the 1930s and 40s was able to provide the colonial ideology with the assurance that the Japanese possessed the body more suitable for ruling the warm climate of South East Asia, replacing the physiologically ill-equipped Westerners. The doctors, however, did not preach the unity of the colonizer and the colonized: they argued for the flexibility and adaptability of the Japanese body. Given some time, the Japanese could be anywhere in the empire. This was the super-race, adaptable to any climate within the empire. It should be noted, however, there was an opposing view, which looked at the assimilation of the Japanese to the tropics with deep pessimism. Although some Japanese imperial physiologists pinned their hope upon the adaptability of this super-race, others were at the same time keenly aware that things were not so simple. Indeed, they were even not sure whether the alleged adaptability of their body to the climate of the tropics was a desirable asset. Behind the intoxicating enthusiasm and the deafening chorus of the construction of the Great East Asian Co-prosperity Sphere, Nietzsche's pessimistic prophesy of mobile humans becoming adaptable, useful, but indistinguishable herd animals was still lurking in the dark.

Discussion points

1. The roles of physiology and epidemiological survey in the making of (late) colonial medicine
2. The roles of immigration of humans and "ecological imperialism" in the making of colonial medicine
3. The rise of "climate" and the making of the identity of race, nation, and human civilization itself.



Fig.1. Perspiration chamber, from Kuno, Physiology of Human Perspiration (1935)

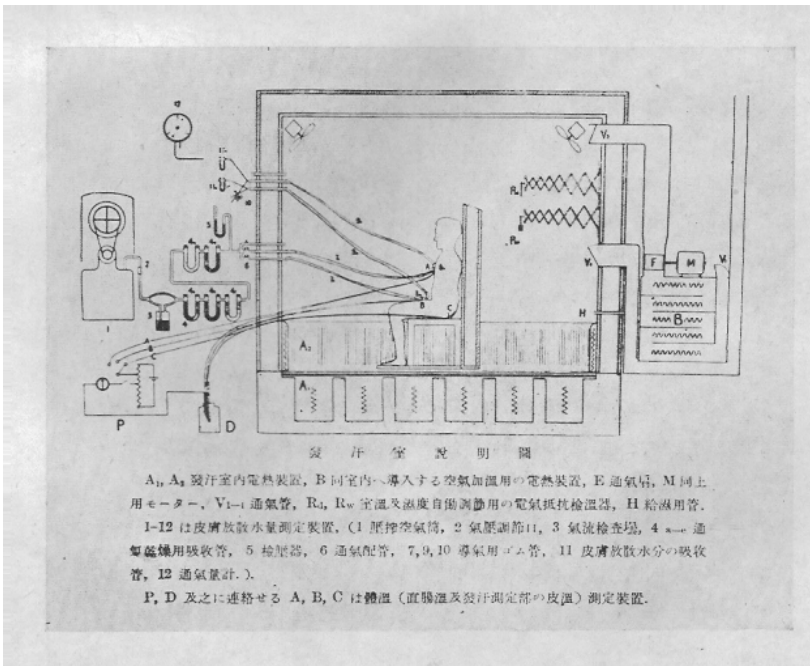


Fig.2. A diagram of a perspiration chamber, from Kuno, Nettai Seikatsu Mondai (1943).

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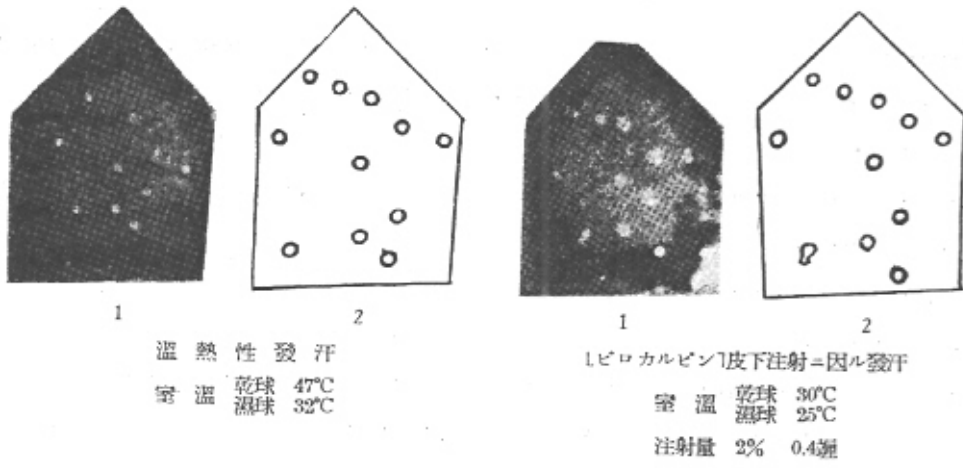


Fig.3 Photographs and diagrams of active glands, from Ogata (1935).