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**“Malaria, Colonial Economics and Migrations in Vietnam”**

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During colonisation, malaria figured at the top of the list of disease statistics, accounting for a relatively constant percentage of hospital cases, about 12%. It occupied second place in the causes of deaths in hospitals, right after cholera. Malaria has a long history in Vietnam, going back long before the colonial presence. It has been even argued that Southeast Asia was the theatre of the first transmission cases of malaria to mankind, the outskirts of tropical forests being the propitious breeding site for harmful *Anopheles* species. However, in my talk today, I would like here to emphasize the primary role of the migration generated by colonisation in the spread of malaria. Secondly, I will examine the colonial control policy and focus on some of the reasons why it failed in many situations.

I – Colonial workforce and malaria

Before the French colonization of Vietnam, the main direction of people migration was southward. It is what has been called the “*Nam tiến*”, or the drive to the south, which resulted in the progressive colonization by the “*Viêt*”, or major ethnic group, of all the lowlands between the Red River delta and the southernmost regions of the Mekong delta (*map 1*). These lowlands offered soil conditions appropriate to the traditional agriculture of the *Viêt*. In addition, once cultivated, they were unfavourable to the “fevers”, unlike the highlands which

remained inhabited by other ethnic groups. Pierre Gourou, of course, gave the most complete, and probably the best, description of the soil utilization by the Viêt.

French colonization introduced new directions of mass population movements. The early military incursions into the northern highlands at the end of the 19<sup>th</sup> century were the first ones. These military operations led the French to realize that these regions were highly malarial, a fact well-known by the delta inhabitants who blamed the “evil spirits” of the forests for polluting the water and for communicating “wood fever”. But, the mobility of workers actually started at the beginning of the 20<sup>th</sup> century, due to both the development of political and commercial interests in China and to the establishment of a colonial policy of « mise valeur ».

With the building of the railway to Yunnan province, it was clear from the very beginning of the 20<sup>th</sup> century that to displace people from the Red River delta to work in endemic areas would lead to an explosion of malaria cases. A French military doctor was assigned to the medical service of a part of the railway, between Yên Bái and Lào Cai, in 1904-1905 (*map 2*). During the rainy season, he reported a morbidity rate among the workers as high as 57%, nearly 90% of illness was due to malaria (*table 1*). Moreover, these figures do not take into account the “free coolies”, not directly recruited by the railway administration, and therefore not registered, who, according to the doctor’s report, deserted as soon as the spectrum of fevers appeared. But even for the other coolies, the mortality rate cannot be precisely known, as a considerable number of the sick workers were in such a bad condition that they were simply repatriated to their native villages (*table 2*). This study concerns only a 45-kilometre portion of the railway, which was not considered to be the most unhealthful one. Still, this portion alone required the recruitment of more than 10 000 coolies.

Not only was the construction of the railway directly responsible for the increase in malaria cases, but it was quickly suspected that epidemics in the villages in the plain were

triggered by the workers returning home. That happened in several provinces in 1905-1906, among them are the provinces of Thai Binh, Hai Duong, Nam Dinh and Hà Đông. Later on, in 1913, a serious epidemic which reached several villages started in the Son Tây province, also located in the delta (*map 3*). The province seemed to have become malarial recently, to judge from the susceptibility of the inhabitants. Most of the cases were of the malignant form of malaria, or *Falciparum* malaria. The increase in the traffic of people between the delta and the highland, mainly because of the wood trade, helped spread the disease.

The building of the railway and increased commercial activity resulted in temporary migrations which contributed greatly to the spread of malaria, all the more so because they concerned mostly non-immune plain inhabitants and because the workforce was constantly being renewed. The permanent transfer of large human groups to new agricultural areas, such as the rubber plantations of the South, was another very important contribution to the global malaria morbidity in the colony (*map 4*). We have no precise data concerning malaria in the early plantations; one of the reasons for this is that they did not belong to the colonial administration. We only know that when the planters began to cultivate the fertile “Red lands”, at the east of Cochin-China, in the 1910s, all the workers were affected by malaria after their stay in the region, and we may conclude from this that many coolies died on the plantations and that others escaped.

Malaria was not the only factor causing sickness in the plantations; the poor diet, the hard work conditions and other infectious diseases also contributed. But these last three factors were usually compounded by malaria. Again, most of the workers were recruited in the Northern delta, because of its overpopulation and poverty. A final factor was the division of labour instituted by the colonists: people from the plains were considered more qualified for work in plantations than the autochthonous people, pejoratively called “Moi”, living in these areas who were often employed for preliminary heavy work, like the clearing of the forest.

The plantations were certainly not the only source of malaria contagion in the southern part of the country. Seasonal epidemics occurred in some parts of the Mekong delta, with generally a majority of mild forms of malaria, or *Vivax* malaria. Malaria was also endemic in coastal areas, at the extreme south, with numerous cases of severe malaria. Nevertheless, the Red land exploitation was the major source of contagion, as demonstrated by a medical inquiry in 1927 which was done following a wide extension of cultivated lands. This year the percentage of parasite infected patients, as determined from blood tests, in the Saigon indigenous hospital, rose dramatically as the result of new admissions of coolies coming from the plantations (*table 3*). The predominant parasite was the *Plasmodium Falciparum* (or *Praecox* as the parasite type was then called).

Due to the opening up of lands, between 1925 and 1929 there was an average of about 17000 new coolies recruited every year, which led to a total of 70000 coolies on the plantations in 1930, at the peak of the rubber plantation development. This means a larger number of transferred people if we consider that some workers were settled on the plantations with their wives and sometimes their children. In the 1920s, the economic cost of the disease and other considerations underlined the importance of strengthening the malaria control policy. The colonial control policy is the point I am going to develop now.

## II – Malaria control policy and scientific research

The comparison of 2 malaria maps, one drawn up in 1907, and the other on the eve of the 2<sup>nd</sup> World War, in 1937, shows both similarities and important differences (*maps 5-6*). Three different areas are represented on each map, corresponding respectively to low, medium and high malaria endemicity, which makes the comparison easy. However, the delimitation of these areas is linked to a measurable factor in the second case, the infant splenic index (*photo*

1) which allowed to estimate the rate of parasite carriers in a given area, while on the first map such a factor is lacking.

The first map was drawn up by Paul-Louis Simond, a Pastorian (*map 5*). He himself did not do medical investigations of malaria, except in a village of a central province where a sudden and serious epidemic occurred in 1898. Simond's map was drawn up from the French physicians' earlier reports, reports which concerned mainly malaria in the colonial army. The map shows the contrast, to use Simond's terms, between "the lowlands, densely populated and cultivated" and "the mountainous territories, covered with woods and uncultivated". In another words, and again I quote Simond : "From the standpoint of malaria, Indochina could be considered divided into 2 regions".

Simond's conclusion underscored an old theme : the cultivation of land as a factor of salubrity. This could be a good prospect for the economic future of the colony, but it also encouraged a "wait and see" attitude from the health administration. However, at the beginning of the 1910s, the epidemiological consequences of the penetration of the northern highlands where permanent military garrisons were stationed led the administration to call for scientific advice.

So, Mathis and Léger, two French Pastorsians, performed the first epidemiological survey over a wide area : they determined the endemic index in many points of different regions of the Tong-king (*map 7*). Clinical exams and blood tests were complemented by entomological inquiries. While confirming that the global epidemiological pattern of malaria in the delta was clearly distinct from the global patterns in the Middle and in High Regions, this study gave a more precise picture of the situation. The scientists pointed out important local differences in each region; they concluded that the penetration of the upland regions was feasible. "As they said: "it is generally possible to find or to create healthy areas where Europeans will manage to settle with few risks of being infected". Again, the conclusion fulfilled the policy of "mise

en valeur” of the territory. A policy which could be put into practice thanks to another project of the colonial authorities: the settling of people from the overpopulated northern delta in the highlands. Regarding colonial policy on migration and its results, I refer you to Andrew Hardy’s important work which covers not only the colonial period, but also the post-independence one.

The practical application of the epidemiological study in the Tong-king was the distribution of the “State quinine” between the provinces according to their endemic index. Instituted in 1909, the State quinine aimed to make the preventive drug available thanks to stocks generally in provincial capitals. But in addition to problems with the functioning of this service, the endemic index had frequently to be re-examined, either because endemic points had not been included in the study or because of a sudden outburst of epidemics in a low indexed province. Another difficulty was that quinine prophylaxis was not easily imposed in the villages. Moreover, quinine proved to be insufficient alone in hyper-endemic areas, especially when applied to populous settlements.

This was particularly the case for the plantations of the South. Following an early initiative by the planters, environmental measures aimed to keep the mosquitoes away were tested in coolie camps in addition to quinine prophylaxis, and they resulted in a decrease in malaria incidence. Nevertheless, the same measures did not apply to all the situations or could result in only short-term improvements. And as the “mise en valeur” of the territory was being achieved with the increase of cultivated lands in the 1920s, it became the colonial administration’s responsibility to encourage further scientific research.

The research and the organization of malaria control were entrusted to the Pasteur Institutes which progressively strengthened their services. A new control strategy was followed. Its model came from the big plantations in Malaysian States and Indonesia where the so-called “species sanitation” had been applied much earlier, and where several French scientists went

for a study trip. The control strategy needed full local entomological studies, that is the determination of vector species, breeding sites and mosquito habits, in every area where species sanitation was to be done. Control was based mainly on anti-larva measures – draining, ditching, oiling, and so on.

The scientists intervened at the request of the land-owner or of the colonial administration. The first trials had been conducted on Red land plantations, before the administration called for scientific assistance in Tuyên-Quang, a centre located at the edge of the Middle and the High region in the northern uplands, whose importance was linked to nearby mines and to the presence of military garrisons (*map 8*). Priority was thus given to economic and military zones, before the malaria services of the Pasteur Institutes turned their attention towards traditional rural areas. However, between 1925 and 1937, enough studies were performed to draw up a malaria map of the territory based on epidemiological data (*map 6*). In addition, at the end of the 1930s the knowledge of the local *Anopheles* fauna was fairly complete.

Did malaria recede in any part of the country? The comparison of the 2 maps suggests that there was some decline at the West and at the South of the Mekong delta. More accurate data seems to confirm that during the first quarter of the 20<sup>th</sup> century there was indeed a malaria decline in southern provinces such as Can-Tho and Bac-Liêu, which was attributed to the extension of the paddy fields. However, the decline did not occur everywhere. For instance ChauDôc, a province close to the Cambodian border, was still a seat of *Falciparum* malaria in the mid 1930s (*map 9*).

Control measures were able to achieve success in some of the Red land plantations. The coolie villages where nice, clean straw huts, surrounded by small gardens were created were quoted as an example (*photos 2,3*). One of the success criteria was the birth rate and the child health in the immigrant families, high rates of abortions and perinatal deaths being one of the consequences of malaria. But there are two factors to consider. First, in no way can we say



that all the control measures recommended for the plantations were followed by all the planters. Not only there were problems with the upkeep of environmental measures, adequate medical surveillance of workers was not always performed, especially on the smaller plantations. Secondly, there were control measure failures : for instance, the proliferation of one vector species following environmental work which destroyed the breeding sites of another species.

Overall, the High Plateaus of southern Vietnam, where most of the colonial plantations were settled, remained highly malarial. Somewhat late in the game, the health status of the autochthonous people, who became “Les populations montagnardes du Sud-Indochinois” during the first Vietnam war, began to concern the sanitary administration. It appeared that there was really a demographical decline among some of them, particularly due to malaria.

At the end of the 1930s, the situation was not much better in the northern uplands. A deterioration had begun in the 4 big urban centres of northern highlands where control measures had been applied at the beginning of the decade (*graphs 1-4*). It appeared that the economic development had led to a population increase which in turn had resulted in an extension of the living zone, beyond the safe area. Furthermore, an accepted belief concerning the relation between the most important local vector, *Anopheles minimus*, and altitude was being challenged (*image 1*). This vector, specific to medium-altitude regions and to running water, was being found at altitudes well over 1000m on a major route which traversed large areas of epidemic disease.

More generally speaking, what became clear with the increase in population movement between the low and high regions was the unstable character of malaria in numerous regions that had been considered fairly free of malaria at the beginning of the century. What resulted was the brutal explosion of serious epidemics in regions where the population was not forewarned . This phenomenon was evident very early in the narrow plains of the center of

the country ; it was reported relatively frequently in the Red River delta toward the end of the 1930s.

### Conclusion

The history of malaria in Vietnam belongs to the global history of the disease. Before the spraying of DDT from the 1950s, the control measures were not particularly successful in the tropical areas, all the more so because they were carried out in limited areas. The particular history of malaria in Vietnam also brings a more general phenomenon in light : the close relationship between malaria, environment and human migrations, a fact which was later dramatically illustrated during the 2 Vietnamese wars. Finally, the malaria control policy, particularly during the 2 first decades of the 20<sup>th</sup> century, was inspired by a view that was widespread in Europe for a long time: malaria eradication could be achieved through the improvement of lands.

Due to the particular profile of malaria in Vietnam as well as the hierarchy of the different ethnic groups in the minds of the colonizers, this policy took on another significance: the improvement of sanitation in the highlands as a civilizing mission. But, although this accelerated the population movements, the settlement patterns in the country did not change very much during the first half of the 20<sup>th</sup> century (see Gourou 's map drawn up in 1940).

I would like to end by a rapid look at the malaria situation in Vietnam to-day. Malaria has not been eliminated in Vietnam; it is still present mostly in some highlands, and some other regions are still unstable. However, in the 1990s the number of malaria cases decreased greatly after a new control strategy was launched by the Vietnamese authorities (*map10*). The new control strategy was put into place after a new wave of internal migration, particularly towards the center Highlands, which had begun with the "Doi moi", or new economical policy, enacted in 1986. This new migration was partly responsible of over 1 million malaria

cases in the country in 1991. Here again we see how economical and political factors played a key role in the launching of research and control programs.