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Vietnamese Studies

25 YEARS OF HEALTH WORK

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No 25 — 1970

25 Years of Health Work

Editor : Nguyen Khac Vien

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PHAM NGOC THACH

(1909-1968)

One could not speak of public health work in the Democratic Republic of Viet Nam without recalling the man who for long years was its animating spirit, Doctor Pham Ngoc Thach.

A noted physician, Pham Ngoc Thach was also an active revolutionary. A tireless worker, he carried out his medical and political activities abreast. His revolutionary conceptions directly inspired his medical work. Balking at no difficulties and privations, he took part in arduous fights of the war of resistance, while helping build up an efficient health system in the hardest material conditions.

After becoming Minister of Health, holding remarkably correct and bold views, he

directed the DRVN's health organization into a fecund path, creatively solving problems that had seemed insoluble. How can a poor country, possessing scant technical means and specialist personnel at the start, satisfy the people's medical needs and also contribute to the development of medical science in the world ? This question was at the heart of his activities and his thinking. A minister, he continued to practise medicine at the hospital and carried on scientific research. His researches on the treatment of tuberculosis and on vaccination with dead BCG have opened new paths. One can say that the whole of health work done in the DRVN, of which we give an outline in this issue, bears the stamp of its animator, Pham Ngoc Thach.

He died in action, leaving numerous admirers and friends, in Viet Nam and in many other countries.

TWENTY-FIVE YEARS OF HEALTH ACTIVITIES IN THE DRVN

Dr. Nguyen Van Huong
Minister of Health

The road travelled by the Health Service of the DRVN during the past quarter century, through two devastating wars separated by a ten-year truce (1955 - 1964), was full of obstacles of all kinds, and one may feel some pride thinking of the efforts that have been made.

Twenty-five years ago, under French rule, our people was living in dire misery, a prey to terrible diseases. Cholera, small pox, typhoid fever, poliomyelitis... were raging, together with tuberculosis, leprosy, malaria, trachoma, syphilis, gonorrhea.., which every year made thousands of victims. Peri-natal mortality reached frightening proportions, especially in the countryside and the Highlands where the rate was 300 and even 400 per thousand. There were only 47 hospitals and 9 maternity homes for the whole country, most of them located in cities and provincial capitals, and only one physician for every 180,000 inhabitants. According to official statistics of the colonial administration, in 1938

the death rate reached 26 per thousand, one of the highest in the world.

In September 1945, as soon as the DRVN was founded, the new regime concerned itself with the problem of public health. But after only twenty days of existence, it had to face aggression by the French colonialists in the South. A year later, war was raging throughout the country.

All along the ensuing nine years of war, despite hard conditions, our civilian and military medical services never failed in their tasks. Physicians, chemists, nurses, laboratory assistants, midwives, hospital staff members, responding to President Ho Chi Minh's appeal, gave up the relative comforts of the cities and joined the *maquis*.

Together with traditional medicine practitioners in the countryside, they set up the first centres of medical treatment and studies and the first units of pharmaceutical production. The College of Medicine and Pharmacy was evacuated to the jungle and new schools were created for the training of cadres (physicians, nurses and midwives) needed by the resistance. By dint of patient efforts, we overcame great obstacles and did good work : no severe epidemic broke out in the free zones during those difficult years.

In the harshest war-time conditions our Health Service, relying on its own efforts, fulfilled its tasks, selflessly serving the front and contributing to strengthen our rear areas. Our endeavour was crowned with success.

In October 1954, peace was restored in North Viet Nam. But when taking over regions formerly held

by the enemy we had to face a terrible sanitary situation. After nine years of war, health conditions in these regions were even worse than in 1945. From all places, sick people flocked to hospitals. We had barely 4,000 hospital beds, while the prophylactic network in the countryside was practically non-existent. As cadres, we had only less than 100 doctors, 200 assistant physicians, and about one thousand nurses, less than the present medical staff of a large province.

In view of this shortage of cadres, what should be done to liquidate as rapidly as possible the aftermath of colonialism and war which had played havoc among the population, now completely exhausted ?

The Viet Nam Workers' Party gave the Health Service clear and precise directives :

— Socialist Vietnamese medicine must serve workers, mothers and children, and national defence. It must contribute to raising the people's living standards and take especial care of the national minorities.

— Prophylaxis is the principal task of Vietnamese medicine.

— Vietnamese medicine must combine prevention with treatment in its network of dispensaries and in the principle of dispensation. In treatment, the patient is to be taken care of as an organic whole.

— Vietnamese medicine must learn from popular, traditional medicine, and study it in the light of modern science.

— The organization of Vietnamese medicine must rely on the masses. Therefore, it must educate the masses

and adopt a line which is not in contradiction with their spirit and interests.

— Vietnamese medicine must rely on its own resources, build up the Health Service by dint of hard work and thrift, while making the most of the precious aid given by our friends.

Following this line, in ten years of peace (1955-1964) we succeeded in solving our most fundamental problems and gradually consolidating our health network.

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The most urgent problem was to eliminate epidemics, infectious diseases, parasitoses and social diseases, which were a constant threat to our people's health.

To this end, two energetic actions were carried out simultaneously : on the one hand, to attack the diseases at their very source, clean up germ-producing factors : drinking water, excreta, refuse, etc., and wipe out germ carriers (flies, mosquitoes, rats, etc..) ; on the other hand, to increase body defence capability through preventive vaccination, and deal with social diseases according to an overall plan. All that was to be done while continuously improving the people's material and cultural standards.

Hygiene and prophylaxis work, which has become a major preoccupation of health authorities and cadres, has achieved brilliant successes. Having got rid of many superstitions and bad habits, each family now has a completely watertight double septic tank and a bathroom, and three or four families share a well. Bodily

hygiene, which has become common practice in the countryside, is being improved through a relentless struggle against rats, flies, mosquitoes, bugs, lice and other vermin. A new way of living has been introduced in which physical culture and sports occupy an increasingly important place. People take especial care to eat clean food and live in clean dwellings.

As a result of massive vaccination, cholera and smallpox completely disappeared by 1957, infantile poliomyelitis by 1961, while cases of typhoid fever are becoming increasingly rare.

Social diseases are vigorously combated. Trachoma is no longer a scourge : from 1955 to 1963, over 11 million persons have got their eyes examined, 8 million have been treated and hundreds of thousands operated on, mostly for entropion. In 1964 alone, 47,056 persons were operated on in village dispensaries, out of a total of 59,212 persons for the whole country.

With Soviet assistance, a ten-year plan for fighting against malaria is being carried out. Early in 1961, committees for the eradication of malaria were created, first in mountain villages. A general offensive against malaria began as early as 1962. After four years of efforts, this terrible endemic receded. In Thai Nguyen, the malarial rate which was 9.25 per cent in 1957 dropped to less than 0.014 per cent in 1962. In Nghe An province, this rate decreased from 8.8 per cent in 1958 to 0.13 per cent in 1964, and in Ha Giang province from 10.76 per cent in 1961 to 0.09 per cent in

1964 etc. By the end of 1964, malaria was on its way to extinction on the territory of the DRVN.

In the struggle against tuberculosis, vaccination with dead BCG and ambulatory treatment associating INR with biogenous stimulins or Bacillus Subtilis have lowered the morbidity rate to 8 per thousand in 1964 from 25 per thousand in 1958. The percentage of primary infections and of tuberculous meningitis among children has also decreased.

To deal with leprosy, we have restored former leper hospitals and built 3 new centres capable of housing 4,000 patients. The largest one, at Quynh Lap, can receive as many as 2,600 patients, and is provided with adequate comforts and an abundant medical material. In 10 years, 5,998 patients have been treated in these centres and 1,510, completely cured, have returned to normal life.

The protection of mothers and children has won encouraging successes. The rate of mortality in childbirth was 0.8 per thousand in 1968, as against 20 per thousand under colonial rule. The infantile mortality rate was only 26 per thousand in 1968 as against 300 per thousand in colonial times.

What has brougtht about these results which have been achieved within only ten years ? They are due firstly to the establishment of a vast health network covering town and countryside, so that any peasant can benefit from its services ; secondly to the training of new cadres who work in concert with thousands of traditional medicine practitioners ; and lastly, to our scientific researches well adapted to national conditions.

While under French rule no health installation whatsoever existed at village level, the number of village health stations reached the figure of 200 by 1955 and 5,286 by 1964, which means that all villages in the delta and 80 per cent in the Highlands are now provided with medical facilities. These health stations can deal with common affections. Each has an average staff of 2 to 4 nurses and midwives. By the end of 1964, the rural medical staff had been reinforced with 2,329 assistant physicians. In addition, we should mention the tens of thousands of hygiene activists working in cooperative farms.

All factories, mines, construction sites, state-managed farming and forest exploitation enterprises have their own health organizations. While in 1956 there were only 42 hospitals and infirmaries, with 1,020 beds, reserved for the personnel of such establishments, by 1964, their number had risen to 183 hospitals and infirmaries, with 6,136 beds.

Besides the state health network, the Association of Traditional Medicine has set up a parallel network in the provinces and districts of the delta. Over 18,000 traditional medicine practitioners are serving in health units in rural and urban areas. Their contribution is most useful in both diagnosis and treatment, and also in the making of drugs.

Red Cross organizations at different levels and hygiene activists in agricultural cooperatives and factories have also made most important contributions.

The number of clinics and hospitals is increasing rapidly. Every provincial or district capital now has

its own health establishment. The number of beds has increased sixteenfold in a decade.

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The training of health cadres, an arduous problem, has been done according to these principles:

— speedy training;

— use of several methods: regular, classical method; refresher courses carried out continuously or in successive waves (thus a nurse trained in 3 months can accede to a higher level with 6, then 9 more months of training); or correspondence courses.

With these methods, we have never suffered from any shortage of practitioners both at the front and in the rear. A judicious combination with traditional medicine and the practice of acupuncture have made it possible for us to cure many common affections with traditional recipes.

With regard to research, we have striven to apply the latest scientific achievements to our actual conditions. Thus we have managed to manufacture dead BCG vaccine (which is easily transported and stored without requiring refrigerators) and other materials formerly not available to us, used Bacillus Subtilis to replace some antibiotics, discovered numerous vegetal antibiotics, manufactured Sabin-Shumakov vaccine, etc.

Our researchers have paid due attention to traditional medicine, popularized traditional methods effective in either prevention or treatment, and discovered medicinal

properties in various plants. Naturally, methods used in other countries are also studied, which accounts for our successes in heart, lung and liver surgery, in the surgical treatment of pharyngo-laryngeal cancers, and in the study of the materia medica of Viet Nam to prepare new pharmaceutical products.

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We had only ten years to carry out that vast programme. For on August 5, 1964, the American aggressors began launching extremely savage attacks against North Viet Nam, in the hope of retrieving their repeated setbacks in the South. With air and naval forces, and weapons of all kinds: explosive bombs, steel-pellet bombs, phosphorus bombs, napalm bombs, delayed action bombs, magnetic bombs, toxic chemicals... they caused heavy damage, especially among the civilian population.

As early as 1965, savage and relentless US bombings forced us to carry out an important reorganization of our work.

The enemy indiscriminately bombed towns and villages, destroying markets, churches, schools, hospitals, massacring women, children and old people. In four years, most provincial and district hospitals and a large number of village health stations suffered irreparable losses. Over 600 major establishments were destroyed, among them the Quynh Lap leper hospital, the Thanh Hoa tuberculosis hospital, etc. Hundreds of

patients were killed during the bombing raids and hospital staffs, including physicians, paid a heavy toll.

It was not by accident that nearly all our health installations were subjected to furious bombings by the US air force. The intention of the US command was obvious: while attacking civilians, it also sought to prevent us from caring for them so as to demoralize the population. These were indeed wicked designs but they came to naught. Both our cadres and our population stood fast. Responding to President Ho Chi Minh's appeal — "Nothing is more precious than independence and freedom" — they vigorously hit back at the raiding aircraft and took appropriate measures to minimize losses.

We rapidly switched from peace to war conditions and successfully adapted our organization to the most unexpected situations, in order to serve production and combat at all costs.

We strengthened our network at the base and organized first aid at all levels, beginning with the production brigades in cooperative farms. Under the slogans "Strengthen the front line" and "Teach emergency surgery to all the medical personnel", we succeeded within a short time in turning our basic units into first-aid centres capable of meeting the most urgent needs.

While in 1964, the health network at the level of the cooperative farm (1) was not yet quite satisfactory, by the end of 1968, most cooperative farms had each a

(1) A village (*xa*) comprises 4 or 5 hamlets (*thon*) each of which forms a co-operative farm.

medical cadre, and about half of them had a first-aid post each. In the provinces of the 4th zone, particularly in Vinh Linh and Quang Binh, this work was done thoroughly. All the cooperative farms of Quang Binh, without exception, had their own medical groups.

The village health stations also underwent rapid development, mainly as a result of improving their material means. From 5,286 in 1964, their number reached 6,041 in 1968, covering 97 per cent of the villages in North Viet Nam; 70 per cent of these posts are in the care of assistant physicians. In Quang Binh and Vinh Linh particularly, all village health stations are headed by assistant physicians. Some are staffed by 2 or 3 of these. All villages are provided with a stock of drugs and roving medicine chests.

Thanks to this adequate organization, we were able to cope with the US supersonic planes: 100 per cent of the wounded received first aid on the spot, and 80 per cent underwent emergency operations in village stations.

The district hospitals had enough material means and cadres to carry out not only common surgery but also obstetrical operations and emergency operations on war wounds. All districts were provided with such establishments by the end of 1968, as against only 27 per cent in 1964.

After March 31, 1968, the Americans having concentrated their destructive efforts against the provinces south of the 19th parallel, the district hospitals and village health stations have played the principal role in caring for the wounded.

The installation of a vast health network reaching down to the villages has proved to be very effective.

The absence of such a network in peace time would surely have meant heavier losses when war came.

Our motto in people's war being to preserve human lives to a maximum, we set up a thick network of civilian defence. Underground passages and shelters allowed the population to work in safety. The trenches in Ly Ninh village alone (in Quang Ninh district, Quang Binh province) were tens of kilometres in length. Quang Binh also had tens of thousands of shelters in the fields, to be used by peasants at work.

Our second success is to have given a strong impetus to the hygiene and prophylaxis movement. In 1966 and 1967, our population dug four times as many wells and built four times as many bathrooms and septic tanks as in ten years of peace.

We have produced all the necessary vaccines and carried out preventive intradermic vaccination for the entire population. During those four years of war, despite the existence of epidemics — cholera, plague — in several neighbouring countries, North Viet Nam was wholly unaffected.

Our third success is to have established a network of drug distribution and medical treatment reaching down to the villages. Combat requirements have been fully met. The growing and use of local medicinal plants has been of great help.

Despite ruthless enemy air raids, we have intensified drug manufacture. 25 new local factories have gone into operation. Many of them, such as those of Quang Binh and Ha Tinh, in spite of typhoons, floods, and

daily enemy bombings, have raised their production in both quantity and quality. Most of the population's needs in medicines have been met.

Our fourth success is to have trained enough cadres who have been thoroughly tested, have acquired adequate professional skill and are animated with great courage, devotion and spirit of sacrifice. Hygiene activists, first-aid assistants, midwives, nurses, assistant physicians, doctors and hospital employees, all have rendered great services to the country. In carrying out their mission, they have all shown revolutionary heroism, working selflessly under enemy fire to save their patients. In this respect those of Vinh Linh, Quang Binh, Nghe An, Ha Tinh, Thanh Hoa and other places have gained particular distinction. By daily practice and research work, our health service has made a worthy contribution to the victory of our entire people.

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If we have victoriously emerged from the trials of war, it is owing to the line set forth by the Party — the premise of all our successes. We have built up our service in the course of a protracted struggle against foreign aggression which has devastated our country during a quarter century, almost without interruption.

We had not only to build from scratch, and make great efforts to remedy the shortage of cadres and material, but also to overcome many superstitions and

old harmful habits. We have done all that work despite the destructions wrought by two successive invasions. At present, with the experience gained and thanks to our revolutionary spirit, we are certain that under the clearsighted leadership of the Workers' Party the Public Health Service, despite all material and technical difficulties, will continue to successfully carry out its heavy tasks.

In our complex and arduous work we have constantly enjoyed valuable material and moral assistance from the fraternal socialist countries and progressive people the world over.

On the strength of this international support our people are determined to bring to a successful end their struggle against Yankee imperialism, in order to complete national liberation and contribute in a positive manner to the defence of the socialist camp and the safeguarding of human rights and dignity.

MASS PROPHYLAXIS ON A NATIONAL SCALE

Dr. Nguyen Van Tin
Vice-Minister of Health

Prophylaxis and Therapeutics

"Prevention is better than cure," says popular wisdom at all times, in the East and in the West. Since Hippocrates, how many great physicians have dreamt of doing away with illness by rendering the environment healthy and improving man's health! This noble ambition, unfortunately, could not come true either under Athenean democracy or with the bourgeois revolution, even less under the feudal and colonial regime. It requires complex and arduous social work, in which material and technical means certainly play a decisive role, but which, in the final analysis, depends rather on the social system. The USA, with its immense riches, could by itself feed, clothe and preserve from disease half of mankind; and yet twenty million Black people and a dozen million other "second-class citizens" on its soil are reduced to living and dwelling conditions absolutely unworthy of modern civilization, falling prey to innumerable physical and mental affections associated with an infernal tempo of work, undernourishment, pollution, social evils, etc. So long as

man is exploited by man and medicine constitutes a branch of commerce, one cannot think of a systematic fight against disease, which, to be a radical one, should put prophylaxis on the forefront while attaching due attention to therapeutics.

Only socialism can meet this requirement for it has the well-being of the people at heart and can mobilize the greatest social resources to serve this purpose. It was Soviet power that, for the first time, put into effect a popular and consistent health program, in which preventive measures were put to the fore in harmonious combination with curative measures. The protection of public health, as included in the political program adopted by the 8th Congress of the CPSU in 1919, proposed to check the propagation of disease by joint efforts in prophylaxis and therapeutics: hygiene in work, housing and food (for the first time, mention was made of ensuring cleanliness of the soil, water and air and instituting a code of hygiene for the benefit of the workers); systematic fight against contagious and social diseases, including venereal diseases and alcoholism; finally, free and appropriate treatment for all sick people. This bold project came into being right after the October Revolution, in the midst of civil war, while this young worker-peasant State could not yet be ranked among the rich or technically advanced countries. Bearing the stamp of Lenin, it advocated a revolutionary line in medical and health work which was later to inspire all the other socialist states, in Europe, Asia and America (Cuba).

Even during the resistance against French colonialism (1945-1954), our very small medical corps, while

trying hard to cure the sick and the wounded, attached increasing importance to prophylaxis. The Microbiology Institute of the Health Ministry, in spite of hard working conditions in the jungle, endeavoured to produce, on a large scale, the main vaccines, especially the anti-cholera, anti-smallpox and anti-typhus ones, which proved to be of vital necessity. Mobile health teams of the Resistance carried out mass vaccinations not only in the free zones but also in some enemy-held areas and elementary notions of hygiene were popularized partly by village health workers and partly by the channel of literacy and complementary education courses. The difficulties arising from the war and the absence of a rural medical and health network did not allow us to conduct consistent prophylactic activities. However, during the nine years of resistance, no epidemics broke out in the mountainous and rural areas under the control of the people's power, whereas frequent epidemic outbreaks were recorded in the urban regions and their outskirsts then under enemy control. In Hanoi in particular, smallpox affected 3,280 people out of 250,000 inhabitants in 1952, 565 people in 1953, of whom 214 died, 1,464 people in 1954, of whom 755 died.

Right after the restoration of peace, along with the setting up of a nation-wide medico-sanitary network, the Workers' Party directed the health services to concentrate efforts on preventive measures, instead of acting on the defensive and merely trying to ward off the blows of various diseases. President Ho Chi Minh in particular, while emphasizing this recommendation,

asked the medical corps to focus their attention on the countryside where the overwhelming majority of the population live and to closely combine modern medicine with traditional medicine with a view to building up a national, scientific and popular medicine. Inspired by those extremely important guidelines, relying on our own experience and following the general line in medical and health work we have been able to give a clear orientation to prophylaxis in our present conditions: *to lay stress on prophylactic activities while stepping up therapeutic activities, to rely on the results of treatment so as to intensify prevention.* We attach prime importance to rural hygiene and mass vaccinations and, while resorting to modern methods, mobilize to the utmost traditional recipes and local resources to serve prophylaxis.

At present prophylactic work in the DRVN is based on a vast specialized network paralleling that of general medicine, or rather grafted on it. At the top, the Prophylaxis Department and the Institute of Hygiene and Epidemiology (where vaccines, serums and anti-serums are made) are like a staff and a commissariat to the Health Ministry for prophylactic activities on a national scale. At intermediate levels, those activities are directed by dispensaries of hygiene and epidemiology in the provinces and sections of hygiene and epidemiology in district dispensaries. At the base, village health workers, while caring for the sick and women in childbirth (including ambulatory treatment), devote most of their time to prophylactic activities, giving health education to the population and doing technical work;

they rely on part-time hygiene activists, much more numerous and deeply rooted in village farm co-ops, who serve as a link with the masses and constitute the nucleus of the mass movement of prophylaxis. Thus, technically directed by specialized bodies, prophylaxis becomes finally the work of the masses themselves.

During the past ten years, a medico-sanitary infrastructure having been laid, we have had to train large numbers of physicians, assistant physicians and nurses specialized in prophylaxis in our medical colleges and secondary medical schools and in accelerated courses, not counting the tens of thousands of volunteer hygiene activists who have acquired in some way a certain knowledge of hygiene necessary for their work. It should be stressed that prophylaxis and therapeutics are for us different, but not quite separate branches. In our present conditions, in face of the numerous infectious, parasitic, endemic or epidemic diseases, our prophylactic personnel must absolutely have some medical knowledge: it is by curing the sick that they earn the confidence of the masses. On the other hand, our hospital personnel, while curing the sick, never fail to inculcate in them elements of hygiene and prophylaxis; moreover, they make periodic trips to rural areas to help village health workers develop the prophylactic movement.

Such is prophylaxis in the general framework of our medico-sanitary work. In our view, this is medicine in an offensive position and, more than any other medical branch, it is an affair of the masses.

Hygiene in Rural Areas

Sixteen years ago, when the resistance against French colonialism ended, the DRVN was faced with almost insurmountable difficulties in the economic and health fields. In addition to the aftermath of colonization and war, there came droughts, typhoons, floods, successive crop failures, etc. Famine, which was rampant in both the lowlands and the mountain regions, would have made innumerable victims but for people's power and the assistance of the socialist countries. Various diseases, more or less successfully combated during the resistance, started a counter-offensive in the whole country. Diarrhoea was widespread; amoebian and bacillary dysenteries and other affections of the digestive canal due to defective food paralyzed whole villages, even whole districts, together with periodic epidemics of influenza. From former enemy-held areas, cholera and smallpox tended to spread again to areas where they had been practically jugulated. The three main social diseases, namely malaria, tuberculosis and trachoma, reached a high rate of morbidity. Parasitoses affected the entire population, almost without exception. Mortality rates among babies and women in childbed were very high.

Of all the factors that brought about such a situation, one must mention first of all the dreadful hygienic conditions at the time, particularly in regions formerly under enemy control. When the French Expeditionary Force withdrew, the big cities, such as Hanoi, Haiphong and Nam Dinh, were full of rubbish and reeked of bad smell

from backhouse cans. Venereal diseases, widely propagated by the colonial soldiery, remained unchecked. Many lepers went about freely, living from beggary or other shameful trades.

Rural hygiene was even worse. The peasants' living conditions had been improved in the free zones but had not undergone any changes in the greater part of the Red River Delta and some mountainous regions where the colonialist occupiers had been in control.

The faecal peril, in particular, was extremely great. It was the source of almost all the bacterial, viral and parasitic diseases occurring in rural areas.

The problem of drinking water also required urgent solution. One of the characteristics of the Vietnamese village in the Northern plains is the presence of a host of ponds and pools. Those expanses of stagnant water were used for all purposes and their cleanliness was measured by their apparent limpidity. (In the peasants' eyes, water was necessarily clean. "All dirt is washed off by water", so a saying went.) There people reared fish, grew water cress, duckweed, lotus and other aquatic plants. Buffaloes came and wallowed, all kinds of things were washed: picks, spades, clothes, the daily rice, even vegetables to be eaten raw. There men and women washed and bathed and children played. The same water, mixed with all sorts of filth and carrying innumerable pathogenic germs, would in most cases be part of the daily consumption.

Housing hygiene was no better. The peasants' huts, with stamped earth floors and mud walls with narrow openings, were small, low-roofed, dark, damp, infested

with flies, mosquitoes, fleas and bugs, etc. Sometimes the peasant put his buffalo in his own house for more safety from theft, and had to get used to the stink of animal secretions. (In the highlands, the montagnard kept his cattle, pigs and poultry under the floor of his houses on stilts to secure them against wild beasts.) He and his large family occupied the rest of the house, eating on the floor, sleeping on paillasses, without mosquito-nets, often sharing a single blanket.

To make it worse, food and body hygiene was entirely neglected. The peasant drank unboiled water—even water from ponds and rice-fields—and often ate raw vegetables; raw pork *(nem)* and raw fish (*goi*) constituted choice dishes and he did not disdain even tainted meat. He used neither soap, tooth brushes, nor even towels.

This sad state of things, left over by centuries of misery and ignorance, still prevailed in the quite recent past. The people's administration was in a position to improve it only after having overcome French colonialist aggression and setting up a medico-sanitary network in the rural areas.

During the first Five-Year Plan (1961 - 1965), our efforts were mainly concentrated on the construction, on a large scale, of what we called the three major installations for rural hygiene, namely the double septic tank, the well with a curb, and the bathroom, in addition to the removal of stables away from dwelling houses.

The double septic tank, as indicated by its name, consists of two water-tight compartments, built ten or twenty centimetres above the ground to prevent the upward

infiltration of rainwater. First, one compartment is put to use, with care taken to get the urine drained out and to cover the faeces with a layer of ash which absorbs humidity and gas. Once it is filled, green leaves are introduced and the opening is stopped. The second compartment is then put to use.

In the first compartment, hermetically closed in this way, the decaying green leaves accelerate the fermentation of faecal matters which can generate a temperature of 60-70° C. Such decomposition going on for two to three months is likely to kill the eggs of intestinal parasites, bacilli and viruses. Then the compartment is opened and one gets dried, de-odorized and sterilized organic matter which is an excellent manure rich in nitrogen and potassium.

The two compartments thus serve in turn as privy and fermentation oven. It should be stressed that the double septic tank must be kept dry and hermetic, otherwise fermentation and hence the sterilization of faecal matters would be impossible.

Such a formula, the fruit of long years of studies to improve upon a popular initiative, has proved to be best suited to the conditions of the Vietnamese countryside. Simple, available to everyone, it has nevertheless proved its effectiveness, making it possible at the same time to ward off the faecal peril, check the proliferation of flies and solve part of the problem of manure for agriculture (the yearly amount of sterilized organic manure that can be thus obtained is estimated at 600,000 tons).

It is not enough, however, to find an applicable formula ; one must also know how to get the people to accept it. Model septic tanks were built to convince the peasants of their salubrity before generalizing their use, first in pilot centres, then throughout a region, spreading like an oil stain. As the traditional village was set up at random, without any plan, it often occurs that the backyard of one house is just in front of another house and therefore it is necessary to consult every peasant family on the convenience of privies being built in the vicinity. Thus, the large-scale construction of septic tanks in rural areas has always required a patient campaign of explanation and arrangement jointly conducted by health and political workers. The good maintenance of those tanks requires that the peasant overcomes his bad habits and realizes the necessity of observing hygiene rules. To achieve this, we carry out a series of concerted measures : regular inspection of latrines by village health authorities ; health education through the basic health network, at school and in evening classes, and through people's organizations ; purchase at encouraging prices by farm coops of organic manure drawn from faecal matters and answering hygienic standards set by the health service, etc. All that means that the extremely complex problem of human faeces in our country requires a many-faceted solution : social, cultural, political and even economic.

The problems of wells, bath-rooms and stables, though presenting no major technical problems as regards their construction, were none the less so many puzzling tasks for the health workers. The sinking

of wells, in particular, in many localities clashed with old superstitions relating to geomancy which forbade the removal of earth from certain places—innumerable as they were arbitrarily determined—under penalty of individual or collective disasters. Here again, as in our whole medico-sanitary work, it is by patient persuasion that the new overcomes the old, step by step, in a process of slow assimilation.

Thanks to a consistent mass line and the combined efforts of various branches of activity, helped by progress in economy and education, rural hygiene has made a real leap forward during the past decade, thoroughly changing the thousand-year-old face of our countryside. The North Vietnamese village, with its local roads and its irrigation canals bordered with filaos, eucalyptuses and Japanese lilacs, has come out of its autarkic life symbolized by the traditional bamboo hedge, to gradually take the road of progress and socialism. The shabby and dark huts of former times have been gradually replaced by decent houses, airy and well-kept, often built of bricks, and one can see at the far end of every garden a double septic tank with whitewashed walls, and a stable sheltering a buffalo with shining black skin, the beast itself being taken to the pond every day for a bathe. Wells with curbs and public bathrooms are in increasing numbers and many families have their own private ones. The use of mosquito-nets is generalized, which has noticeably curbed the spread of viral and parasitic diseases transmitted by mosquitoes, and so is the use of individual towels and soap which has helped check the propagation of trachoma and skin

diseases. The younger generation, especially, has got into the habit of drinking boiled water, and using tooth-brushes and tooth-paste. Young women and young girls ask for more and more undergarments, sanitary towels and other articles for their bodily care, and expectant mothers go to the health station for periodic examinations. In many regions, people actively destroy flies and seek to keep mosquitoes away by growing certain aromatic herbs such as citronellas and *man tuoi* (Eupatorium Staechadosmum Hanche) around their houses.

At present there are on the average one double septic tank, one well and one bathroom respectively for 1.4, 3.3 and 4.7 households. Rural hygiene in the DRVN is certainly far from reaching the standard in advanced countries, but the least one can say is that it is on the right path and has recorded progress without precedent in our history.

Mass Vaccinations

Infectious diseases — bacterial and viral — being the more widespread in the present conditions of Viet Nam, one of the main tasks of prophylaxis consists in checking their propagation to the utmost by active immunization of the population, pending their final elimination. Mass vaccinations, systematically carried out from 1955 onward, have made it possible to jugulate or check many epidemic affections. Our Ministry of Health

has all along attached prime importance to the large-scale production of the main vaccines (anti-smallpox, anti-cholera, anti-TAB, anti-rabies, anti-tetanus, anti-diphtheria, anti-poliomyelitis, etc.). This large-scale job, though full of difficulties for a still under-developed country, has been successfully carried out by our Institute of Hygiene and Epidemiology.

As regards cholera and smallpox, which had caused great ravages all along our history, decimating whole villages — cholera in the lowlands and smallpox in the highlands — the fight has been arduous but relatively little complicated in the technical field, for our health service has enough means and experience. It has been greatly facilitated by the setting up of an omnipresent medico-sanitary network, completed in the main in late 1958. By that date, those two centuries-old scourges had been practically eradicated. Thanks to vaccinations and preventive hygiene, the DRVN was preserved from cholera epidemics caused by the El Tor vibrio, which struck nearly all countries in South and Southeast Asia from 1961 onward, from India to Indonesia, from the Philippines to Hongkong, including South Viet Nam.

No sooner had cholera and smallpox been jugulated than another scourge came to the fore, less dreadful by its mortality rate but redoubtable by its sequels: poliomyelitis. This primarily infantile disease, long known in an endemic state, suddenly burst into successive epidemics during the years 1958, 1959 and 1960: it evolved from an endemic to an epidemic and spread from the cities to the countryside. The situation called for

prompt and radical intervention. The Soviet Union came to the rescue, sending to the DRVN many million doses of live Sabin-Shumakov vaccine, efficacious against the three species of polio-virus. On the basis of technical data supplied by the USSR Academy of Medical Sciences, our Institute of Hygiene and Epidemiology tried to prepare this triple oral vaccine. The work, directed by Doctor Hoang Thuy Nguyen, was crowned with success in late 1960 and since then our children have been regularly vaccinated against this affection with tragic consequences. Since 1961, only sporadic cases have been recorded, with rather benign clinical manifestations and mostly with no sequels. Thus the DRVN ranks among the first countries to have eradicated poliomyelitis by relying on their own means.

Dead BCG, widely used in anti-TB prophylaxis since late 1960, constitutes another success of our research workers. Up to then, we had used live BCG, prepared according to classical methods. Although efficacious, this vaccine nevertheless presented major inconveniences: it required preservation in refrigerators and allergy tests prior to vaccination and was ill-suited for our villages without electricity and the professional standard of our rural medical corps, then mainly composed of nurses and health workers who had undergone only rough training. We turned to an anti-TB vaccine prepared from killed bacilli, although numerous attempts in that direction had failed and the use of live BCG had been international standard practice since 1933. Without being discouraged, our phthisiologists and bacteriologists, in particular Drs Pham Ngoc Thach and

Dang Duc Trach and Mrs Nguyen Thi Hoi, conducted new experiments on the basis of the thesis advanced by Weiss, which contradicted the established conclusions. After three years of research, between 1957 and 1960, they were able to prove that BCG killed by exposure to a temperature of 43°C in one month retains all the immunizing power of live BCG without requiring, as the latter does, preservation in refrigerators or previous allergy tests. Dead BCG meets the conditions of a developing country in the best possible way; it has helped reduce tuberculosis morbidity to less than 1 per thousand (1). Experiments carried out by our leprologists have proved that it can also be used in leprosy prevention with the same effectiveness as live BCG.

The sense of national realities, which has impregnated all our medical and health work, has also determined our choice of an adequate technique of vaccination. Except for anti-smallpox and anti-poliomyelitis vaccines, administered respectively by scarification and through the mouth, we started about ten years ago to practise vaccination by intradermic injection, shown by Wallgren to be the most efficacious. This method, already experimented in France, England and other countries, was not adopted because of their conservative health legislation. And yet it had proved this basic advantage over the classical method of subcutaneous injection: causing almost no reactions (if there are any they are rather local than general or focal) and

(1) See in this issue: "Twenty-five Years of Efforts to Combat Tuberculosis."

no complications, it makes it possible to dismiss all contra-indication and hence to generalize vaccinations so as to achieve collective immunity. Perfectly within reach of our rural personnel, it has been applied on a mass scale without causing any incident so far. This is a practical problem of decisive importance: even if enough vaccines had been made, it would have been impossible to practise mass vaccination by subcutaneous injection in such a country as ours, for it would have required complicated supervision of the action of each vaccine on each category of subjects, and many would not have been vaccinated on account of their health condition and the risks they might run.

Again, to simplify practical operations to the utmost, for long years we have been using polyvalent vaccines, in a combination which only increases the effect of each element, as has been demonstrated by recent researches. At present we make use of an hexavalent vaccine combining dead BCG with anti-TAB, anti-cholera, anti-tetanus vaccines, which not only confers specific immunity against each of the six pathogenic agents in question but also stimulates non-specific defence which seems particularly efficacious against the Hansen bacillus, colon bacillus and streptococci.

Few peoples in the world have been vaccinated with such regularity and on such a large scale as the DRVN people during the past ten years. In 1964 alone, the laboratories of the Institute of Hygiene and Epidemiology of Hanoi produced three times as much vaccine as the Pasteur Institute during seven years, from 1926 to 1933, for the whole of former French Indochina (Viet Nam,

Laos and Cambodia). The quality of the vaccines in use and the efficacy of mass vaccinations (which were carried on even at the height of US aggression, between 1965 and 1968) can be measured by the following figures relating to some epidemic diseases:

Incidence of some main epidemic diseases in DRVN from 1964 to 1969, before, during and after US air war.
(*Number of sick people for every* 100,000 *inhabitants*)

Name of disease	1964 (pre-war year)	Years of war				1969 (post-war year)
		1965	1966	1967	1968	
Typhoid fever	12.3	10.3	4	1.9	2	1.12
Poliomyelitis	1.6	0.6	0.5	0.4	0.07	0.07
Diphtheria	5.2	3.2	2.9	0.8	0.4	0.69

The regression of the above-mentioned affections is due, of course, not only to vaccinations, but also to the mass movement of hygiene and the results of treatment. We also try *Bacillus Subtilis*; it seems that its introduction through the nose helps check the spread of whooping-cough, measles and influenza during epidemic outbreaks.

The range of vaccines produced has widened unceasingly, and by now includes all the main kinds. Our Institute of Hygiene and Epidemiology has just worked out vaccines against measles and leptospirosis;

others are under research, especially those against Japanese encephalitis B, and rickettsias. Relying on recent works on immunology concerning parasites, specialists of the Institute of Malariology, Parasitology and Entomology and those of the Institute of Hygiene and Epidemiology are joining their efforts in researches on vaccines against malaria and helminthiasis, prepared from antigens of plasmodium and intestinal worms. These are arduous scientific work which, in case of success, would open up new prospects to the fight against parasitic diseases which form at present, along with infectious diseases, the main range of diseases in Viet Nam and in most countries of the Third World as well.

Problems of the Future

The progress made in rural hygiene and the results of mass vaccinations, although very important, are only a first step in a complex and long-term job. Even in the still simple living conditions of an agricultural country, they hardly meet the minimal requirements of the two fundamental tasks of preventive medicine: salubrity of the environment and strengthening of the defence—both non-specific and specific—of the organism. Shortage of material and technical means, lack of experience among the personnel, hindrances left over from the past, insufficient awakening of the masses, together with difficulties caused by successive wars of aggression by the imperialists, such are the major obstacles that have prevented us from thoroughly solving the

various problems posed in the field of hygiene and prophylaxis for a developing society. Those problems, far from growing more simple with the profound economic and social changes taking place with every passing year, have only become even more numerous and more diverse.

Socialist industrialization, started even before 1960, has brought us face to face with a series of new difficulties, while the aftermaths of feudalism, colonialism and war are still weighing heavy on us. The opening of large construction sites, the building of new engineering and chemical plants, the mechanization of the mining industry, the rapid growth of cities, the formation of new urban and pre-urban centres, all those much wished-for changes in turn require an urgent solution to the problem of collective and individual hygiene in industrial environment and that of prevention of occupational diseases and pollution (to cite only an example: silicosis was not much of a danger as long as handicraft methods prevailed in coal mines). We have to see to good working conditions in factories by ensuring adequate ventilation, lighting and security against toxic gases, dust and accidents. We have to think of de-polluting the air, cleaning up waste waters from factories and of a vast, comprehensive plan to ensure hygiene and prophylaxis in urban development... We have tackled part of those new and arduous tasks, but our first efforts were hindered by US aggression and at present our work has practically to be started anew.

Industrialization also poses new problems in rural hygiene. With the increasingly widespread use of insecticides and chemical fertilizers, we have to think of how

to secure foodstuffs, primarily vegetables and fruit, against noxious matters.

The eradication of infectious and parasitic diseases is expected within the next ten or fifteen years. Then we will be facing new pathologic forms peculiar to modern society: nutritional diseases, cardio-vascular affections, senility affections, mental diseases, cancer, and others, which will require quite different preventive facilities from those we have at present. Getting ready to face such a situation, we have begun in part to tackle those problems of the future, relating to regimens of nutrition, work and rest, physical education on a national scale, mental hygiene, early tracking of diseases by para-clinical means, application of genetic laws, etc. Of course, the achievements of preventive medicine in the world and the experience of advanced countries will be of great help to us; yet we shall have to apply them with creativeness to the conditions of our country, and to enrich them with our own experience and researches.

For when we set ourselves the task of building a scientific, national and popular medicine, this applies to all its component fields, hygiene and prophylaxis as well as therapeutics.

MOTHER AND CHILD WELFARE

Mme Dinh Thi Can
Vice-Minister of Health

Despised and treated as being under age by the feudal regime, the Vietnamese woman saw her condition grow even worse under the colonial rule. For the whole country, there were only 300 hospital beds for maternity and child care, most of them reserved for the privileged classes. There were neither infirmaries nor maternity homes in the villages: women were delivered at their homes, with the help of their relatives or midwives who knew nothing about hygiene. Superstitious practices further aggravated obstetric complications. Numerous diseases decimated the children: umbilical tetanus, small-pox, malaria, broncho-pneumonia, hereditary syphilis, etc. Maternal and infantile mortality rates were dreadful:

20 ‰ of lying-in women
300 to 500 ‰ of new-born babies
400 ‰ of children under one year.

The woman, the mother and the child did not enjoy any social legislation, any health protection, and their labour was subjected to even harsher exploitation than that of men.

After liberation, our people at once set about building up an effective system of mother and child welfare, on both the social and health planes. The policy of promoting women in the political and social fields advocated by our Party and Government was accompanied by systematic and appropriate measures in the health field.

The first Constitution of the DRVN (1946) stipulated:

"The State defends the rights and interests of the mother and the child, ensures the development of maternity homes, nurseries and kindergartens."

Right in the beginning of the first war of resistance, a Committee for the Protection of Children was set up to care for the education and health of the children. In 1960 the Marriage and Family Act was promulgated. It is aimed at defending the interests of women and children and abolishing age-old harmful customs, ensures full equality between man and woman and prohibits polygamy. Children are entitled to the necessary measures for their education and health. That same year, a Committee for the Protection of Children and Teenagers was created, and 1963 saw the birth of the Committee for Mother and Child Protection, presided over by Premier Pham Van Dong. This committee, set up at provincial, district and village levels, is headed by the chairman of the local administrative committee and its members include leading officials of women's and youth organizations, trade unions, teachers' unions and health services. All these measures and organizations have helped bring about a real mobilization in favour of the women and children.

At present, 97.5 per cent of our villages have their own maternity home-infirmaries. All provincial and district capitals are provided with hospitals, with a total of 24,500 beds reserved for lying-in mothers and children. A vast health network for women covers the country, from the capital to the remotest villages with 751 gynaecologist-obstetricians, 369 paediatricians, 13,684 midwives. This personnel perform pre-natal examinations, deliveries and hospital and ambulatory treatment of gynaecologic diseases; 87 per cent of the district hospitals are in a position to deal with cases of difficult parturition and perform emergency operations in obstetrical surgery.

In factories, construction sites, farm co-ops, forestry sites, etc., there exist at present 50,000 nurseries which receive 600,000 children from one month to three years old every day; 45,900 kindergartens are attended by 1,600,000 children from 3 to 7 years old; 115,000 nurses and schoolmistresses are in charge of those nurseries and classes. Conscious of their rights and interests the women and their organizations have considerably assisted the State in this work.

There has been a rapid dissemination of elementary hygiene, especially in the villages. For family use, peasant households have thus sunk over 900,000 wells and built close to 750,000 bath-rooms within the space of a few years, thus greatly improving sanitary arrangements for the women.

Numerous dispensaries for examinations and ambulatory treatment of gynaecologic diseases, set up wherever

a sizable number of women work, constitute a complement to the hospitals.

In 1962, a large-scale campaign for family planning was launched and got a sympathetic reception from the whole population ; the movement spread to many rural areas. Birth-rates went down from 46.1‰ in 1960 to less than 33‰ in 1968.

Besides government and popular organizations, let us mention also the *to tro san* (groups for help in confinement), which number 40,000 and unite some 600,000 women in small mutual-aid groups which offer multiform assistance to pregnant and lying-in women. There are, besides, some 67,000 volunteers engaged in active propaganda for mother and child welfare.

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* *

Mother and child welfare work was put to a severe trial by the US bombings. Steel-pellet bombs, rockets, napalm and phosphorus bombs massively and indiscriminately dropped on towns and villages could cause untold harm especially to the children. Considerable efforts were made by the whole population to evacuate and scatter creches, nurseries and kindergartens. Underground shelters, sometimes 15-17 metres deep, and trenches ensured safety for the children. Nurses and schoolmistresses diplayed admirable vigilance and heroism in their efforts to save the lives of many children. Physicians and midwives unfailingly discharged their duties under the bombings, giving timely aid in dystocia and other urgent cases. Thus we were able

to limit casualties to a considerable extent, and mother and child welfare work, far from receding during the war, has made continual progress.

Villages go on building maternity home-infirmaries, nurseries, kindergartens, primary schools, and family bathrooms. These efforts have been well rewarded.

	1945	1968
Rates of maternal mortality	20‰	0.8‰
Rates of new-born infant mortality	300-400‰	14.25‰
Mortality of babies under one month		19.32‰
Mortality of children under one year	400‰	32.72‰

Venereal diseases have been rapidly wiped out with the establishment of the new social regime. Endemic and epidemic diseases, so dreadful in former times (small-pox, cholera, poliomyelitis, malaria, etc.), have been practically done away with.

However, the economic conditions of our country, which has known thirty years of war and has not yet gone very far in industrialization, still limit the scope of our efforts. As Prime Minister Pham Van Dong said at a plenary meeting of the Committee for Mother and Child Protection :

" What we have achieved is surely very important compared with what existed before, but it is very little in relation to our needs. We still have a lot to do to show our will and solicitude and give greater effectiveness and better organization to our movement for mother and child protection. "

THE FIGHT AGAINST MALARIA

Dr Do Duong Thai

One of the most widespread social diseases under colonial rule, malaria was rampant over three-fourths of North Viet Nam's territory, with a population of 8 million at the time.

Malariological surveys were conducted by the colonial authorities. Aimed solely at protecting the personnel of French-owned farming and industrial enterprises and military posts, they were fragmentary and did not lead to any serious measures to eradicate the disease.

I. The Stages of the Fight

The eradication of malaria is a long-term task. In the conditions of Viet Nam, it proves to be particularly arduous.

The hot and damp tropical climate and the abundance of waterways favour the growth of vectors and hematozoa.

No less than 22 species of anopheles have been discovered. The smallest, but also most widely found and

most dangerous, species is *anopheles minimus*. Three varieties of parasites have been identified. The main species is *P. falciparum*. Then comes *P. vivax*. *P. malariae* is rather rare.

A backward agricultural country, North Viet Nam suffered from a shortage of material, equipment and personnel for a large-scale struggle. In addition, roads were lacking in the highlands where the main effort of the campaign should be concentrated. A long war of resistance against French colonialism then against a merciless US war of destruction further complicated the problem and multiplied difficulties.

However, the fight against malaria was started right in the first years of people's power. It was part of the effort to preserve public health, a major preoccupation of our government. During the war against the French colonialists, it retained our attention all the more as the main bases of the resistance were located in mountainous regions infested with malaria.

Medical workers, who lived among the highland people, with their help set about studying the epidemiology of malaria and the means to combat it. The data collected were quite abundant. They enabled us to work out plans which, with the slogan "destroy mosquitoes and guard against their bites", were aimed at limiting the debilitating effects of malaria on production and defence efforts. The means resorted to were fairly efficient and a certain regression of the disease was noted in many places.

The restoration of peace in 1954 enabled us to comtemplate the systematic and large-scale eradication of malaria.

As early as the first post-war years, epidemiological surveys were conducted on a large scale. The results achieved enabled us to lay the basis for an eradication program. Put into practice in 1958, this program comprises four stages: preparation, attack, consolidation and preservation.

The preparatory stage lay between 1958 and 1961.

The Health Ministry directed its efforts toward the training of specialist medical personnel as early as 1958. Researches were conducted on the epidemiology of malaria. Our medical workers also tested the efficacy of many medicines on hematozoa and worked out the most efficient and most economical way of using insecticides.

Thai Nguyen province was chosen as a testing-ground before starting a nation-wide campaign.

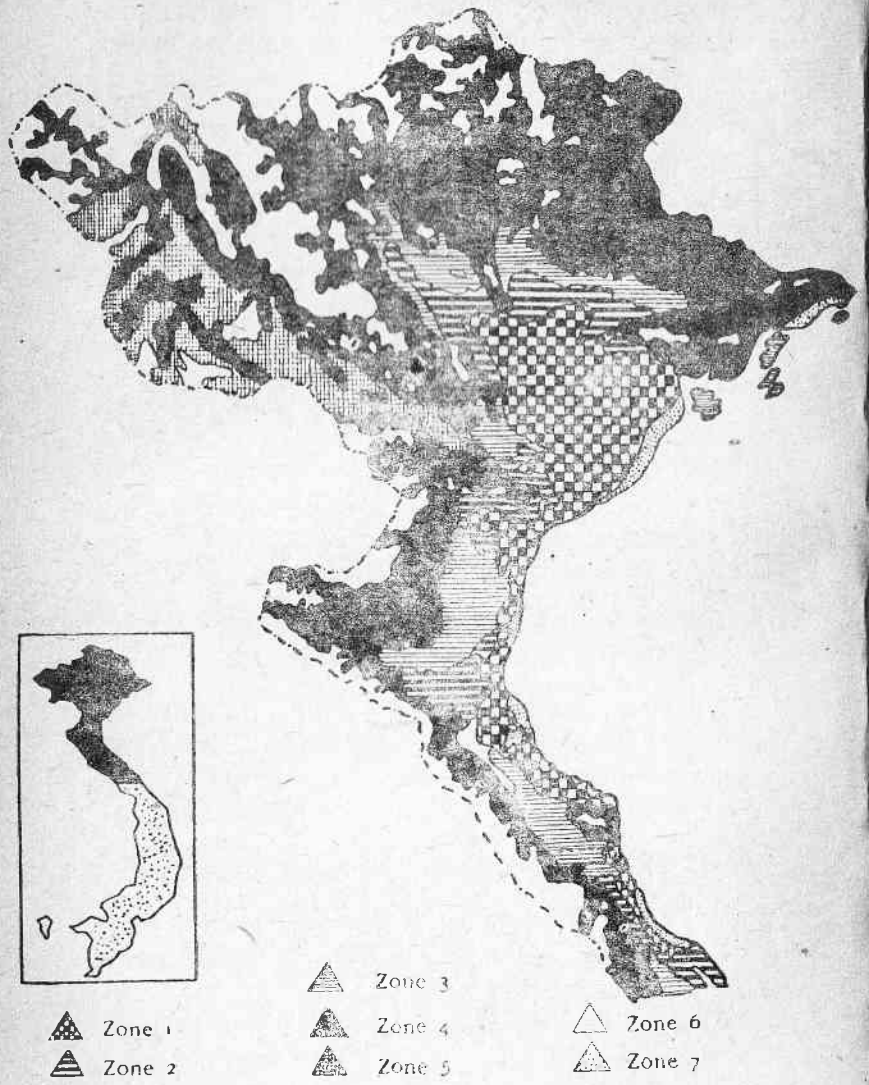
The following tables show the results recorded. The experiment put to the test the scientific basis and practical value of the program. It gave rise to high hopes.

The offensive stage extended from 1962 to 1968.

It consisted in:

— destroying vectors by DDT sprayings during three consecutive years.

Malariological map of the DRVN

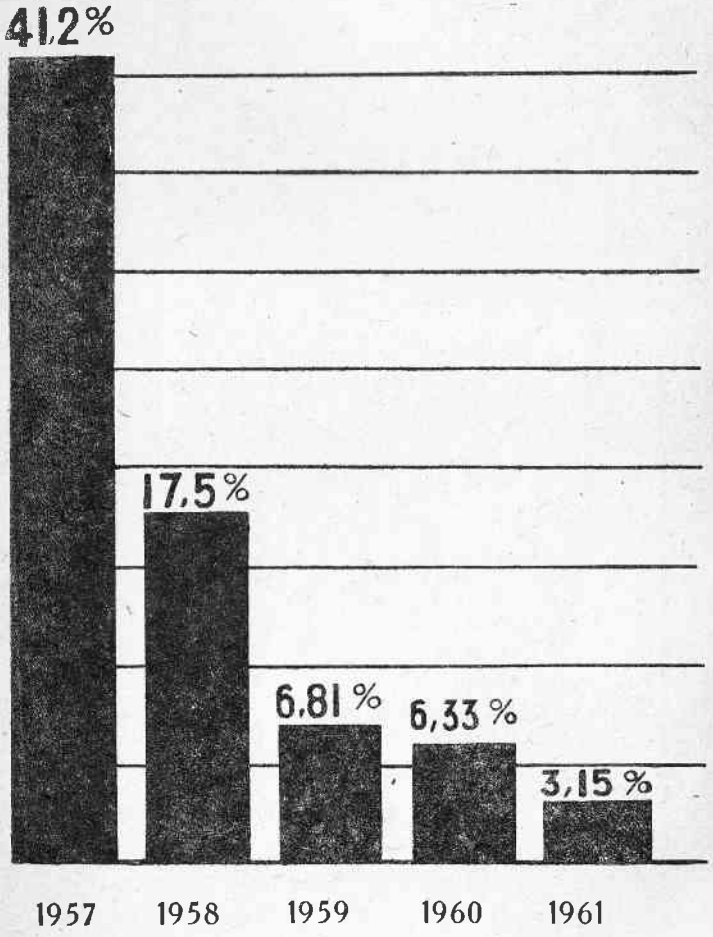


Malariological chart

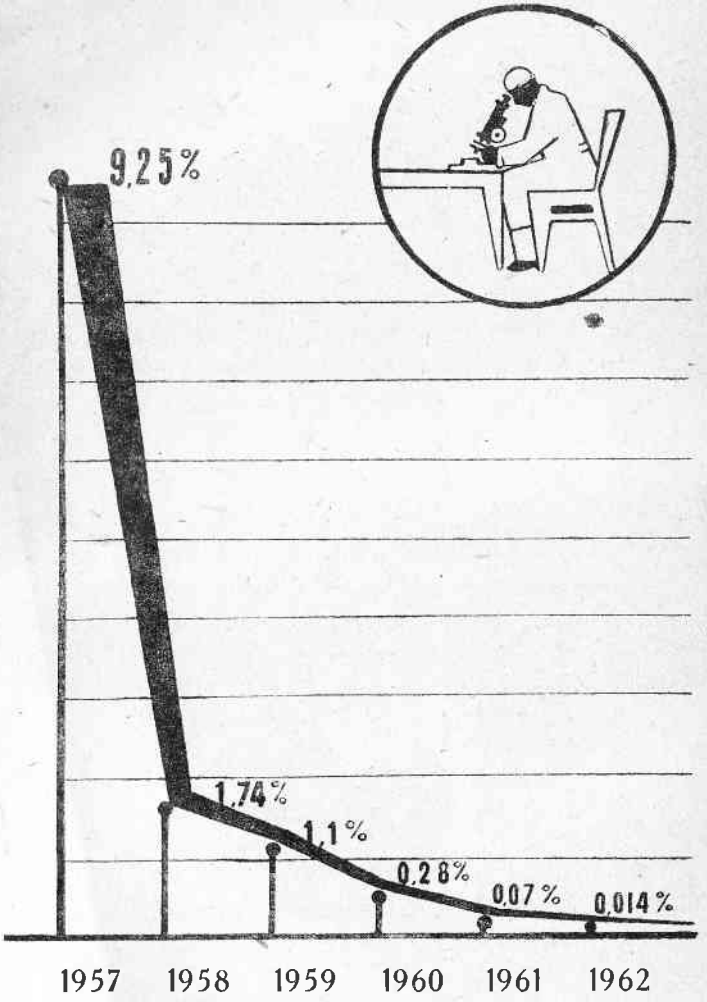
Distribution of malarial endemics in North Viet Nam

Zone	Epidemiology	Area %	Population %
Zone 1 : the Delta	No endemic, but sporadic epidemics	12	65
Zone 2 : low hills, running waters	Light endemic	5	9
Zone 3 : hills, running waters	Moderate endemic	8	9
Zone 4 : mountains and forests, running waters	Serious endemic	51	13
Zone 5 : plateaux	Light endemic	5	1
Zone 6 : high mountains	No endemic	18	0,5
Zone 7 : coastal areas	Light endemic, but serious endemic in some mountainous places	1	2.5

Regression of the splenic index in the pilot province of Thai Nguyen (fight starting in 1958)



Regression of the plasmodic index in Thai Nguyen



— destroying larva beds, protecting the population against mosquito bites.

— distributing anti-malaria drugs, according to areas, either to the whole population or only to people having fits of fever during the year.

This offensive stage could have been shortened but for US aggression. The war occasioned movements among the population. It compelled us to disperse factories and public services which were, in some places, installed in shelters. However, it did not bring about any slackening of our efforts in the anti-malaria struggle. In spite of US air attacks, the tracking and treatment of the disease, and the spraying of DDT continued without a hitch. The plasmodic index was maintained at a fairly low level. Epidemics of malaria were quickly stamped out. Vast regions have passed on to the stage of consolidation.

This is a good basis which has enabled us, since the cessation of the bombings, to make new efforts so as to further lower the plasmodic index and bring the whole of North Viet Nam to a new stage in the anti-malaria struggle.

II. Organization and Technical Problems

We shall describe hereafter the general line we have followed in this fight to wipe out malaria, the particular features of organization and the technical means resorted to.

1. A MASS LINE

The wiping out of a social disease greatly concerns the masses. We have followed the principle of relying on the masses. If the population as a whole realize the ravages of the disease and the necessity of preventing it, and are acquainted with the means to combat it, then they will give us assistance in surmounting numerous difficulties. The transport, in time of war, of thousands of tons of insecticides, drugs and materials up to the remotest mountain hamlets could not be done without their participation. At each insecticide spraying, people clean their houses, arrange the furniture, then see to it that the sprayed insecticide is preserved. The treatment of the disease calls for the use of drugs during a long period and according to prescribed doses. It cannot be administered without the consent of the sick and the assistance of "sick people's groups". Popular co-operation is also necessary for clearing bushes around the houses, removing stables and pigsties away from dwelling places, and encouraging the use of mosquito nets. During the war, the spraying of DDT in shelters, barracks and in the jungle, and the treatment of small groups of scattered population could only be carried on with the active help of the population. One cannot lay too much stress on the fact that no medical organization, however large and complete, can lead the fight against malaria to a successful end if the masses do not adopt its program.

2. MALARIA ERADICATION COMMITTEES

The eradication of malaria, like that of social diseases in general, is not the work of the health service alone. To be successful, it requires co-ordination with other public services and people's organizations.

Services of education and information are charged with the dissemination of scientific knowledge and propaganda work. Transport services ensure the transport of materials and drugs. Agriculture and forestry services conduct the fight against malaria right in the State farms and forestry sites. Youth and women's unions play their part in disseminating notions of preventive hygiene; they make preparations for the spraying of insecticides and other necessary technical measures.

That is why we have set up malaria eradication committees, from national to district levels. Their tasks consist in working out eradication plans at their respective level and mobilizing the population to participate in their implementation. The composition of these committees is as follows:

The committee chairman is either the chairman or vice-chairman of the Administrative Committee of the same level.

The vice-chairman is the chief health officer of the same level.

Committee members are representatives of the services of education, information, transport, agriculture and forestry, of youth and women's organizations, of trade-unions, etc.

Thanks to their composition, the committees can carry out propaganda work in depth and mobilize the masses for the struggle.

3. HEALTH SERVICES SPECIALIZED IN THE FIGHT AGAINST MALARIA

Specialized health services assume the technical direction of the movement. Founded in 1957, the Institute of Malariology, Parasitology and Entomology is entrusted with doing research work, working out plans and technical measures, carrying them out and controlling their application.

It is helped in its task by the Technical Sub-committee of the Central Committee for the Eradication of Malaria.

At local levels we have a specialized health organization for the fight against malaria: provincial anti-malaria service, and district anti-malaria teams. This local organization adapts technical measures to concrete local conditions and sees to their good implementation. It makes it possible for us to have DDT sprayed regularly, everywhere and at prescribed doses, and to make blood tests in war time as well as in peace time.

Its effectiveness was proved when owing to the war communications became difficult and the Institute of Malariology was bombed. The personnel of the Institute none the less continued their activities by relying on local organizations.

The anti-malaria organization is interconnected from the base to the top. It takes charge of the plans for malaria eradication in the whole country.

4. THE BASIC HEALTH NETWORK

The anti-malaria health organization would lose most of its efficiency if it stopped at district level. For in North Viet Nam, villages are scattered, especially in the mountain regions. After all, they are responsible for the application of technical measures on their territories and the mobilization of their inhabitants.

Thus the fight against malaria at village level relies on the health network which we have set up: village infirmary, health groups in farm co-ops, health workers and hygiene activists in production teams, infirmaries in public services, industrial enterprises, construction sites, forestry sites, schools, etc.

Those units assign agents to look after the anti-malaria fight. After getting the necessary training, they are charged with carrying out DDT sprayings, treating the sick and making blood tests. They assume the task of tracking malaria cases and hotbeds of contamination. They go from house to house, helped by activists, to search for clinical cases. That is what we call active tracking. Passive tracking is done by village infirmaries and district and provincial hospitals, on persons in a feverish condition who come to be looked after. A third method is "systematic tracking", in which every activist collects a certain number of blood

samples proportional to the density of the population in the area assigned to him.

5. TECHNICAL MEASURES

Apart from classical measures, we resort to other measures adapted to the concrete conditions of the country and of our health organization.

Sprayers' teams. In some countries, professional sprayers' teams are set up. In our country, spraying is entrusted to semi-professional teams set up on the spot and their activities are intermittent. In general, there is a team for every four or five villages. Though it requires the training of a large number of sprayers, this system presents great advantages. The sprayers can carry on their normal production work. Working in their home places, they know the manners and customs of the people, and their task is made all the easier. Moreover, the system is economical: a full-time salaried personnel would entail large expenses for the State. When a malaria epidemic breaks out and requires sprayings of DDT, we can gather sprayers on the spot.

Treatment of the sick. If the treatment of malarians were carried out in hospitals, we would never have enough beds and physicians, considering the large number of sick people.

Treatment has been divided as follows: Preventive treatment is entrusted to hygiene activists in production brigades and consists in the administration of

anti-malaria drugs during three years. Village infirmaries are charged with the treatment of persistent fits of fever capable of turning into pernicious fever. This enables us to give timely treatment to the sick and spare them long travels. The system is all the more advantageous as in war time the population is scattered and travels dangerous.

We have taken care to apply all technical measures simultaneously so that their actions complement each other. Thus the destruction of mosquitoes goes together with that of larvae and measures taken to avoid mosquito bites.

It goes without saying that in this field we do not overlook the participation of the population. To strengthen the effect of insecticides, they rear fish to destroy larvae, clear the bushes around their houses, build stables and pigsties away from dwelling-places, which are moved away from streams and grouped in clusters instead of being scattered as before.

Combining traditional with western medicine, we set great store by anti-malaria drugs, febrifuges and tonics of the traditional pharmacopoeia.

Finally, both anti-malaria drugs and insecticides are given free of charge to the population.

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Malaria has not been completely wiped out in North Viet Nam yet. But after ten years of continuous struggle on a national scale, it has practically ceased prevailing

as an endemic. The plasmodic index has been reduced from 3.19% to 0.02% of the population in malaria-infested areas. Vast regions where malaria was rampant have become healthy. The rapid regression of the disease is greatly conducive to the improvement of the health of our people, and to the economic and cultural development of the mountain regions, the traditional dwelling-place of the national minorities. The fight against malaria constitutes an important contribution to the building of socialism and to our production and war efforts in the resistance to US aggression.

Those successes are due, first of all, to the leadership and solicitude of the Party and Government. The fight against malaria is only one of the many facets of their efforts to protect public health and raise the living standards of the people.

The successes of the fight lie also in the application of a mass line. Conducting large-scale propaganda work among the people, inculcating in them the necessary technical knowledge, relying on them — that is the key which has helped us to overcome many a difficulty. The eradication of malaria, a job of the health service, is in fact a revolutionary task.

Our successes also result from the scientific basis of our eradication program, meticulous préparations and efficient organization. The implementation of the plan has been the work of devoted cadres, many of whom died gloriously at their task, not from the evil which they combated but from American raids.

TWENTY - FIVE YEARS OF EFFORTS TO COMBAT TUBERCULOSIS

Dr Pham Khac Quang

Generalities

Tuberculosis, a reputedly fatal illness, inspired great terror under the former regimes and was ranked first among the " four incurable diseases ". This most widespread social affection caused great ravages, killing its victim in almost every case, either in its fairly common galloping forms or within a few years in its chronic forms found mostly among grown-up people. People believed it to be a hereditary disease and sometimes resorted to sorcery to combat it. The great masters of our traditional medicine, especially Lan Ong in the 18th century, affirmed however that it was an infectious and family disease, though they did not succeed in jugulating it.

Under colonial rule, tuberculosis prevailed in frightening proportions, not only among the toiling classes whose living and dwelling conditions were miserable, but also among the well-to-do, because of poor hygiene and total lack of prophylactic measures. According to very incomplete data, out of every

1,000 inhabitants of big cities like Hanoi and Saigon, 4 or 5 died of tuberculosis every year. Tuberculin tests, summarily conducted as they were, indicated extremely high infection rates; to take a single example, in 1928 Massias registered 65 % of positive reactions among the adults, 32.6 % among the adolescents and 17.6 % among the children in Hanoi. Morbidity and mortality rates were certainly not less alarming in the countryside which was then absolutely out of reach of the health services and where famine was prevailing permanently.

In face of such a situation, the colonial administration took a few derisory measures. In Hanoi, Hue and Saigon, three anti-TB dispensaries existed, but in name rather than in fact, and for the whole of what is now the entire territory of the DRVN there were just over one hundred beds for bed-ridden tuberculars. As regards treatment, Isoniazid, Streptomycin and PAS were used only on a very small scale in the areas occupied by the French, up to late 1954. As far as prophylaxis was concerned, the Hanoi and Saigon Pasteur Institutes used BCG only on a trial basis and on a tiny portion of the population.

As soon as it was founded, the Democratic Republic of Viet Nam could have undertaken consistent health work and anti-TB struggle but for the return of the French colonialist troops and the ensuing nine-year war of resistance. In spite of harsh war time conditions, great efforts were made during those nine years to limit the harm that might be done by tuberculosis in the free zones. Three special hospitals were created to this

effect, where patients were given treatment with Streptomycin and PAS from 1948 onward and with Isoniazid from 1952 onward. The latter was used in association first with the other two, then with Filatov biogenous stimulins. The association of anti-bacterial treatment with tissue therapeutics, successfully experimented in 1953 in the free zones of South Viet Nam and later on perfected by the DRVN Tuberculosis Institute, was to open a new path in the treatment of phtisis in our country. The war, however, prevented any large-scale application.

The health situation was alarming after the restoration of peace. The people, bled white by colonization and exhausted by the war, suffered moreover from successive bad harvests due to floods and typhoons. Deplorable sanitary conditions, especially in the former occupied zones, paved the way for endemic affections and epidemic explosions. Consumptives filled the hospitals and many had to be out-patients, for want of beds. It was necessary to set up a nationwide health network, a precondition for systematic struggle against diseases.

The foundations of such a network were laid during three years of intensive efforts made conjointly with the economic rehabilitation ending in 1958. By this date, cholera and smallpox had been practically checked. Conditions were ripe for starting the fight against the three main social diseases: malaria, trachoma and tuberculosis. Specific networks were to be grafted on the general health infrastructure and were to develop in close union with it.

The Tuberculosis Institute, created by Government decree on June 24, 1957, was entrusted with organizing and leading this fight on a national scale. By 1960, after several years of systematic research, it was able to propose a solution to the fundamental problems, on both the technical and organizational planes and in all three domains: epidemiology, prophylaxis and therapeutics. For the first time ever, a program for fighting tuberculosis was mentioned in the five-year State plan of 1961-1965 in these words: "Carrying out BCG vaccination of children to protect them against tuberculosis and leprosy, making use of methods that are the most efficacious and most suited for our conditions to treat tuberculosis among the adults."

Epidemiologic Research

Epidemiologic studies, neglected under colonial rule and impossible during the anti-French resistance, were to serve as a starting point for the anti-TB struggle. Indeed one could not combat a social disease in a planned way without having such basic data as infection rates, morbidity rates and the distribution of pathologic forms in different regions and in the country as a whole. Systematic surveys are the more important as they alone enable us to follow the progress of the fight, assess the merits of the methods used and the organization set up, and find out shortcomings in time.

The study of tuberculous infection by biologic tests being inexpensive and easy to carry out, we thought of

it at first as a means to get an approximate idea of morbidity. We first resorted to the Mantoux tuberculin test which proved to be the best at the time, using old OT tuberculin as well as purified PPD tuberculin. Very soon, we came to the conclusion that this method is rather delicate in its interpretation, as eminent specialists from different countries still hold differing views on how to decide whether a reaction is positive or negative. That is why, relying on recent works, especially those of E. Bernard, of Fourestier and Blaque Blair, of Kraus and Dvorak, we tried the BCG test which, in our opinion, seemed to be the best in our conditions to reveal tuberculous allergy. From 1958 onward, we adopted the BCG test carried out with BCG killed at 120°C in intradermic injection with doses of 1/400 mg of bacilli. In the countryside for instance, we found out that 51.12% of the population reacted to the BCG test while only 36.4% presented a positive Mantoux reaction with 20 UT (the rates recorded were respectively for the two methods: 86.68% and 71% among people over thirty years of age, 15.66% and 9.63% for infants less than 5 years old.)

To establish the rates of morbidity, we resorted to radiography, which had made great progress in the world. Having at our disposal only three apparatuses and a handful of specialists, and being therefore unable to undertake systematic tracking among the whole population, we concentrated our surveys on definite human groups in specific areas. During three years, from 1957 to 1959, we took X-ray photographs of 200,000 people, surveying whole villages in the delta,

the midlands and the highlands, whole urban quarters, whole provincial capitals, whole industrial enterprises, and paying appropriate attention to exposed occupations.

The interpretation of radiographs posed a delicate problem, that of diagnosis and especially that of differential diagnosis. Although pulmonary tuberculosis was the most frequent form of lung diseases, one should guard against labelling all suspected sick people as tuberculars even in case of hemoptysis. We were led to determine certain data concerning pulmonary mycosis and sclerosis as well as other bacterial, parasitic or viral lung diseases and bronchial cancer. As bacteriological diagnosis was necessary in face of the uncertainty of radiology, we tried to improve certain techniques of homogenization and culture, bringing them within reach of poorly-equipped laboratories in the provinces and districts, and enabling them to confirm the revealed cases by searching for the Koch bacillus.

Then we thought of using the search for Koch bacilli as a means of tracking tuberculosis in a mass way. Bacteriological tracking, much less expensive than radiologic tracking, presents also other advantages: while long years are needed to train a radiologist, six months are enough to train a personnel capable of making bacteriological examinations of spittle; this personnel, instead of burdening themselves with an X-ray apparatus and a power generator over difficult roads, can carry on their backs an ordinary microscope and laboratory reagents and get to the remotest places. Surely some cases may be overlooked, but never those

with large numbers of bacilli, that is, the most dangerous cases from the viewpoint of anti-TB prophylaxis. Besides, in our present economic conditions, we have no ambition to cure all tuberculars irrespective of the degree of seriousness of their condition, but concentrate our efforts first on contagious cases. Our views on the bacteriological tracking of tuberculosis were expounded in a communication to the 14th Congress of the Organization against Tuberculosis held in New Delhi in 1957.

The epidemiologic surveys undertaken between 1957 and 1960 produced the following data:

1. Rates of tuberculous allergy revealed by BCG test: 90% among adults over thirty years old and 30% among children less than 5 years old in the cities; 80% and 20% for the same classes of people in the countryside, 50% and 10% in the highlands where national minorities live.

2. Rates of tuberculous morbidity revealed by radiography (for 100 inhabitants): 2.06% of active tuberculosis in the cities, 1.6% in factories, 2.3% in the villages in the delta, 1.62% in those of the midlands and 1% in those of the highlands.

3. Rates of open tuberculosis revealed by direct bacilloscopy (for 1,000 inhabitants): 2.5‰ in the cities, from 1.8 to 2.5‰ in rural areas and from 0.5 to 1‰ in the highlands.

Such was an outline of epidemiologic studies of tuberculosis in the DRVN, established according to relatively simple but effective methods, perfectly

adapted to the possibilities of a country without great economic means.

Modern anti-TB Therapeutics Adapted to National Conditions

For each of our activities, it has been necessary for us constantly to keep in mind the conditions of our country, a poor country advancing toward socialism, a country whose needs are far greater than its material and technical possibilities. This contradiction confronted us with this alternative: we could either strictly observe the therapeutics that have been successfully tested in advanced countries and in this way cure only an insignificant number of sick people, or dispense mass treatment and to this end find out means and methods suited to national realities. We chose the second road.

The classical treatment with INH + streptomycin + PAS, efficacious as it is, presents however several major inconveniences: too expensive to be applied on a large scale, it requires, in addition, complicated supervision, as streptomycin is toxic and can cause ear lesions. Our conditions, on the contrary, require a simple, economical and non-toxic treatment that can be handled by medical workers in rural areas: assistant physicians, nurses, health workers of farm co-ops, etc. Trying again the combination of anti-bacterial medicament with tissue therapeutics used against tuberculosis during the anti-French resistance and relying on the

experience of traditional medicine, we worked out a new therapeutic formula as early as 1955: tablets of INH (5mg per kg) associated with injections of Filatov biogenous stimulins into the area of pulmonary acupuncture (omo-vertebral space, 2 cm from the median line). This treatment, relatively easy to apply, costs six times less than the classical treatment. The results were, however, not less satisfactory. In fresh forms, infiltrative or nodular, with or without cavities, radiologic clearing is obtained within the first six months and spittle test becomes negative within the first three months. Miliary tuberculosis is cleared within three months. Old cases of fibro-cavernous tuberculosis are stabilized, with negative spittle tests in 40% of cases.

The new treatment was quickly generalized in the whole country. Later on, our TB specialists added live Bacillus Subtilis administered in aerosol, by intra-bronchial instillation, or by injection. This adjunction of Subtilis has given improved results, with more rapid disappearance of Koch bacilli.

For all those important innovations, we are indebted to our senior colleague, Dr Pham Ngoc Thach, the late Minister of Health and Director of the Tuberculosis Institute who, not long before his death, said: "We think we have thus worked out an efficacious treatment which can be applied on a large scale in a poor country."

Within the bounds of our means, we have at the same time practised surgical treatment of the graver forms of pulmonary tuberculosis, primarily in fibro-cavernous cases with marked breathing deficiency.

Encouraging successes have been recorded. After several years of practice, we have come to the conclusion that the best treatment for such forms is enlarged thoracoplasty, less complicated and more advantageous than partial or total resection of the lungs.

Dead BCG and Mass Prophylaxis

While attaching great importance to therapeutic problems, we have never lost sight of the fact that in the anti-TB struggle and in all our health work as well, it is prophylaxis that comes first, being of most decisive importance in the final analysis. Anti-TB prophylaxis requires a series of concerted measures: wiping out hotbeds of contamination, improvement of living standards for the masses, well-balanced regimens of work and rest, sports and physical training, prophylactic hygiene, etc. BCG vaccination, in particular, has been at the heart of our preoccupations.

From 1958 to 1960, we made our first trials of live vaccines with BCG and M vaccines. We performed 100,000 vaccinations of live BCG for children and newborn babies in the cities. For the first time in our country, vaccinations of this kind were performed on such a large scale and the results proved to be excellent. However, they could not go beyond the bounds of an experimentation, for, if it is to be generalized, vaccination of live BCG requires preservation in refrigerators, which is impossible in our rural areas which have no electricity and where the overwhelming majority of the

population live. This vaccination also requires complicated allergologic tests and even when lyophilized, live vaccine does not keep well in our hot and damp climate.

The search for dead vaccine remained the only way for us to practise mass vaccination. Numerous efforts to this end had failed, unfortunately, and a paper published by the World Health Organization in 1955 affirmed that dead vaccine, even when administered in big doses, did not secure immunity. In spite of those failures, inspired by the works of Weiss which contradicted the scientific orthodoxy of the time, Dr Pham Ngoc Thach, the bacteriologist Dang Duc Trach and their collaborators took up the problem again, on a new basis this time. After three years of research, in 1960 they found out that BCG killed by being kept at 43°C during one month, injected at the same dose as live BCG, brought about approximately the same immunity for guinea-pigs and mice. Experiments on humans confirmed the tests on animals and since 1962, vaccination with BCG killed at 43°C has become common practice in the Democratic Republic of Viet Nam. The first epidemiologic results recorded were conclusive. For 8,629 babies vaccinated and then watched during three years, the rate of morbidity was 0.07% whereas for 484 others, who were not vaccinated, it was 10.3% over the same period, i.e. 147 times as high. In families in which one of the parents was a bacilli-carrying tubercular it was 0.79% among children vaccinated at their births and watched during two years, and 61.5% among those not vaccinated. i.e, 77 times as high.

Dead BCG, which does not require any special care for preservation, has enabled us to generalize anti-TB vaccination, the more so as it can be administered without previous allergy test and without discrimination to allergic subjects. We have adopted intradermic injection, which has been proved by Wallgren as the most efficacious, and which requires only a dose of insignificant vaccine as compared with subcutaneous injection. Dead BCG was later on used in association with other vaccines (we preferably produce polyvalent vaccines), which increased its efficacy, as demonstrated by recent works on the reticulo-endothelial system.

With the generalization of anti-TB vaccination, the complicated problem of anti-TB prophylaxis can be considered resolved in the main, pending the implementation of other measures which depend on economic progress. To this day, twenty million vaccinations with dead BCG have been performed in the DRVN.

Along with technical activities, we have paid particular attention to stepping up the mass movement of disease prevention by large-scale education on hygiene, relying on our omnipresent health network and mobilizing all means put at our disposal by the people's administration. This education is intended primarily for parents and grown-ups and also for schoolboys and schoolgirls. By means of booklets, talks, exhibitions, projections of films and slides, explanations made in individual peasant families, we call upon the people to render their living environment healthy by observing rules of hygiene, to ward off the danger of contamination by getting vaccinated and by helping to stamp out, or

at least to check, hotbeds of contamination. Our health workers try to be as specific as possible. For example they advise the sick to sleep in a separate bed, to wear a gauze mask, to spit into a box filled with lime or ash, to bury the spittle, not to kiss children and not to cough in front of them. Treatment, mainly ambulatory, inspires confidence by the results it yields and becomes also a dynamic factor of anti-TB propaganda, the best propagandists being the patients themselves in most cases.

The democratic State has put at our disposal important means for health education among the masses. Special broadcasts on anti-TB struggle have been given over the radio. A film has been made, dealing with the TB danger and the anti-TB activities of the medical personnel and the masses. It should be added that anti-TB propaganda is not only carried out by specialist workers in the anti-TB network, but also by other health workers, political cadres, educational workers and even members of mobile teams of cinema projection.

An Organization Relying Both on the State and the People

Our health organization, set up and managed by the State, presents nevertheless a marked mass character, especially in its infrastructure.

As we have pointed out, it is on the general medico-sanitary infrastructure that the anti-TB network is

grafted and this network itself functions along a mass line.

Organization means cadre. The problems of cadres, which comes first in organization, has been at the heart of our preoccupations since the years 1957 - 1960, the period of preparatory work preceding the systematic offensive against tuberculosis. Starting with general medical workers, our network has endeavoured to train a specialist personnel in pneumo - phthisiology which numbers at present hundreds of physicians and assistant physicians, thousands of nurses and tens of thousands of health workers. We have attached especial attention to the training of personnel at basic levels who will be largely responsible for the successes in therapeutics and prophylaxis, once the major technical problems have been resolved and the organization set up. We see to the constant improvement of the professional and moral standards of our personnel, for the anti - TB fight requires not only knowledge but also much patience and abnegation. In other words, the training of cadres is not done exclusively at school or in accelerated courses, but is continued for the whole duration of their professional practice, in both the scientific-technical and the politico - ideological spheres.

As regards its structure, our network has been so conceived that, just like that of general medicine on which it is grafted, it must be omnipresent and well gradated, that there is both gradation and coordination between its various levels and that, as a superstructure, while keeping its autonomy, it can best profit by the material and technical facilities and achievements

of the infrastructure, so as finally to develop in symbiosis with the latter. It consists, starting from the base, of a sanatorium - dispensary of ten to twenty beds serving one or several villages, an urban quarter or a factory ; an anti-TB section within the district polyclinic, equipped with means for bacteriological tracking ; a provincial anti-TB dispensary usually including an X-ray section, a bacteriological section, an outpatients' section and an inpatients' section of one or several hundred beds. Those organs constitute as many centres of anti-TB activities in their respective areas, taking charge of tracking, treatment (including treatment of outpatients), prophylaxis and anti-TB propaganda among the masses. The higher level directs and supervises the lower one in the technical field. Topping the whole network, at national level, the Hanoi Tuberculosis Institute is concurrently a centre of scientific research, treatment and specialist training and at the same time the headquarters of the struggle.

The State takes charge of the organization and direction of the anti - TB struggle and bears the larger part of the expenses. Vaccinations are free of charge. Medical care is almost wholly free too, expenses being covered for a large part by trade union funds for workers and public servants, by the farm and handicraft co - ops' funds for peasants and craftsmen.

The medico - sanitary personnel from district level upwards is paid by the State and that at village level is paid by the farm co-ops which also pay a large part of the expenses related to the training of rural health workers. In the present conditions of our country, the anti - TB

struggle on a national scale has been possible only thanks to the combined efforts of the State and the people.

From over one hundred in 1954, the number of hospital beds for tuberculars in the whole country had risen to 6,500 by late 1964, just before the US war escalation. By that date, the province of Thanh Hoa, with 1,500,000 inhabitants, had its own TB hospital of 600 beds, which was also an important centre of scientific research, and a network of over 100 sanatorium - dispensaries in villages. That large hospital was razed to the ground by US bombers together with hundreds of other hospitals and health establishments of the DRVN during the US aggression from early 1965 to late 1968. But the anti-TB struggle continued its steady advance under the bombs, thanks to our simple but efficacious techniques, our omnipresent apparatus, firm and well tested, our personnel, well trained professionally and well seasoned politically and ideologically, and the active participation of the masses. We can say that our organization of anti - TB struggle has stood the test in war as well as in peace time.

Results and Prospects

Simultaneous efforts in treatment and prevention during the past ten years have brought about excellent results, decisive in certain respects. The 1961-1965 period in particular, which corresponded to the first five-year plan (unfinished because of US aggression), was marked by a radical change in the epidemiologic pattern of tuberculosis in the DRVN.

Evolution of TB epidemiology in DRVN from 1961 to 1965

	1961	1962	1963	1964	1965
Morbidity rates (active TB, by radiographic examination)	1.04%	0.84%	0.67%	0.43%	0.4%
Rates of active bacilloscopy	0.24%	0.21%	0.16%	0.085%	0.08%

On the eve of US aggression, in 1965, the anti-TB struggle was advancing at a quick tempo and but for this criminal war, in the following year it would have passed to the next stage, which was to correspond to our second five-year plan. The aggressor brutally hindered our peaceful work which, however, was continued conjointly with the armed resistance, but at the cost of innumerable efforts ! The successes recorded during this extremely difficult period were not negligible, as proved by radiographic surveys carried out in 1969 in the most savagely attacked areas : morbidity rates there remained approximately the same as before the war, with no marked increase. This was a remarkable achievement, considering the hardships and sufferings imposed on our fellow-countrymen.

Even under the bombs, we did not neglect scientific research. The study of the pathogenesis of pneumophthisic affections, actively carried on at the Hanoi Tuberculosis Institute and many provincial TB hospitals, led us naturally to immunology. We have tackled the problems of vaccines conferring immunity

but causing no allergy, that of non-specific immunity in tuberculosis, that of self-immunizing diseases and others. With dead BCG and live Bacillus Subtilis, we have at our disposal the necessary means for studying the stimulation of the reticulo-endothelial system by B.N. Halpern's technique of colloidal carbon. Our ambition is constantly to improve our therapeutic and prophylactic methods with all available national possibilities so as to lead the anti-TB struggle to final victory in the shortest possible time.

The wiping out of tuberculosis certainly does not depend solely on the efforts of the health services and there is still much to do in the economic and social fields to help achieve this result. But we are confident that our people's regime, which has the well-being of the people at heart, will be able to bring everything into play in order to attain this goal.

TRACHOMA — ALMOST A THING OF THE PAST

Prof. Nguyen Xuan Nguyen

Trachoma, a social scourge inherent in under-developed countries, had its roots in bad and unhealthy living and dwelling conditions, i.e. in misery and ignorance. Bequeathed by thousands of years of feudalism, it worsened under the colonial regime. At the time, summary surveys, though carried out without qualified personnel and adequate means, revealed an extremely high morbidity rate: 65% for the whole country and 90% in some regions of the Red River Delta. As medical care was above the reach of the labouring people, the sick had recourse to quacks and anti-scientific remedies which aggravated the illness: licking the sore eyes, plastering with crushed leaves, application of a frog, etc. The situation in 1954, when the French withdrew, was painful: there were about 8 million trachomatous people and over 100,000 blind ones, out of a population of some 13 million. Surveys undertaken by the people's power between 1955 and 1960 revealed a still more cruel reality, with morbidity rates varying between 80% and 90% and blindness rates between 1 and 4% according to the areas.

As early as the establishment of the democratic State in 1945, our Ministry of Health had worked out a program for combating this social disease, redoubtable for its complications and its consequences. Delayed by a nine-year war, the fight was resumed vigorously at the restoration of peace.

We have always thought that the anti-trachoma struggle in our country must necessarily comprise four major stages :

The first, that of preparatory work, is devoted to tracking the disease, and to technical experimentations and pilot organizational schemes on a small scale. It is above all the period of training specialist personnel.

The second stage starts with a general offensive against the disease, on an ever wider front. It requires a central command to direct and coordinate the fight according to a plan. It is the longest stage and requires simultaneous efforts in both therapy and prophylaxis ; while medical care gradually lowers the percentage of active trachoma and its complications, preventive measures must further limit new infections as well as relapses. The results achieved must be confirmed by intensive and widespread efforts in prophylaxis.

With the third stage, one enters the period of treatment of sequels left by trachoma, which requires delicate therapeutic techniques, such as keratoplasty, diversion of the Stenon canal, etc.

Lastly, the fourth and final stage is that of total eradication of the scourge, after which trachoma will become a disease of the past.

Right at the beginning, the Ministry of Health assumed direct leadership of the anti-trachoma struggle which led to the establishment of the Institute of Ophthalmology and Trachoma in July 1957. The new organ was entrusted with arduous tasks which made it the real General Staff of the people's administration in this long-term work :

— To organize surveys on morbidity rates in various regions of the country, to study the etiologic and epidemiologic factors conditioning the appearance and propagation of the disease, so as to lay a scientific basis for prophylactic work.

— To make researches for the simplest, most economical, and most efficacious methods of treatment making it possible to launch a mass struggle against trachoma and stamp out contamination rapidly.

— To train specialist personnel with the speed and the scope required by the program of struggle.

— To work out plans for eradicating the scourge within a period of twenty to thirty years.

— To organize and direct scientific research.

The Institute is also charged with directing and coodinating the activities of ophthalmological centres and anti-trachoma dispensaries at all levels—provincial, district and village. It comprises a section of statistics and epidemiology, a control section, a section of anti-trachoma propaganda and personnel training, a laboratory of virology, a laboratory of bacteriology,a laboratory of pathologic anatomy, a laboratory of experimental pathology, a clinical laboratory, a trachoma clinic,

an anti-trachoma dispensary and two mobile brigades for clinical experimentation and control.

During the three years of economic rehabilitation (1955-1957), in face of numerous difficulties, we largely profited by the material and technical aid of the Soviet Union which sent us large amounts of medicines and a team of specialists to advise us. Preparatory work done in that period was completed by late 1960. By this date, we had organized over 400 exprimentation and tracking stations. All our efforts were concentrated on training specialist personnel and we were able to set up 32 mobile anti-trachoma teams, each comprising two assistant-physicians and five nurses. Those were real shock-units scattered in the provinces of the Red River delta where we also set up 14 local ophthalmological centers and 482 anti-trachoma stations in villages.

For the first time, one could see organized struggle against eye diseases in the villages. Our health workers, together with political cadres, launched sustained propaganda campaigns on elementary rules of hygiene, eye protection and defence against trachoma, using every means at their disposal: talks, roving exhibitions, film shows. After supplying explanations, they embarked on practical activities. Under large mosquito-nets which kept out flies, village nurses examined the sick, applied medicaments and, if need be, performed operations on entropion and trichiasis. (The surgical treatment of entropion and trichiasis, in colonial times, was entrusted only to specialists in ophthalmology who could be counted on the fingers of one hand. The DRVN Ministry of Health has taken the good initiative of having it

performed even in rural anti-trachoma dispensaries, which has helped save a large number of people from blindness). By their devotion and know-how, our specialist personnel won great prestige and their advice was followed faithfully. Soon our peasants got into the habit of using individual face towels and clean water; it was a decisive step in anti-trachoma hygiene and prevention if one remembers that they were used to washing their faces with pond water, wiping them with their hands or a piece of cloth used by all members of the family.

At the beginning of 1961, the first year of the first five-year plan (1961-1965), we entered upon the second stage of the anti-trachoma struggle, with a general offensive carried out in the coastal regions and the lowlands. Our network, perfected in 1965, comprises an ophthalmological centre and an anti-trachoma dispensary at provincial level, a smaller anti-trachoma dispensary at district level and, at the lowest level, a small anti-trachoma dispensary and a station for surgical treatment of entropion-trichiasis for one or several villages. One must add the already mentioned 32 mobile anti-trachoma teams who continue their activities in the provinces, as well as small anti-trachoma stations set up in urban quaters and in a large number of factories, construction sites, schools, etc. The Ophthalmological and Trachoma Institute of Hanoi, which tops the whole network, has become a centre for treatment of difficult and complicated cases and at the same time one for scientific research and training of specialist personnel.

After fifteen years of systematic struggle, we have recorded good results : 11,000,000 people examined ; over 8,000,000 people treated and over 4,000,000 of them completely cured ; hundreds of thousands of operations on entropion and trichiasis and hundreds of cornea-grafting operations. Surveys made these last few years have shown a very encouraging decrease of trachoma morbidity in rural areas. Morbidity rates stand between 40% and 50% in the delta region and in some villages at less than 10%. Generally speaking, the physiognomy of trachoma has completely changed ; florid and confluent forms of trachoma, folliculomatous pannues, and entropions of all four eyelids with symblepharon have become so rare that medical students now must study some forms of trachoma not on patients but in photographic records. Another success of decisive significance deserves to be mentioned : during the past fifteen years, we have also trained hundreds of physicians and assistant physicians specializing in ophthalmology, thousands of nurses for the anti-trachoma struggle in the villages and tens of thousands of propagandists for anti-trachoma hygiene in the farm co-ops.

In the scientific and technical field, our ophthalmologists and trachomatologists have constantly sought to improve our methods of examination, treatment and prophylaxis on the basis of national experience and in the light of the achievements of world science. Workers at the Hanoi Ophthalmological and Trachoma Institute, in particular, have many a time improved operating techniques for entropion and trichiasis and

treatment techniques for trachomatous pannues. The application of cornea transplanting, of the diversion of the Stenon canal, of dacryorhinostomy, etc., to the surgical treatment of complications and sequels of trachoma has led to excellent results.

Great efforts were made as early as 1959 to find an efficacious and inexpensive medicament for treatment and prevention of trachoma, to be prepared from local materials. After two years of research and experimentation, our scientific workers, in collaboration with those of the Institute of Materia Medica, succeeded in extracting from *fibrauria tinctoria* an alkaloid with high antibiotic properties, chlorhydrate of palmatin, which comes into the preparation of eye-wash and ointments for the treatment of conjunctivitis, blepharitis and trachoma. Associated with mechanotherapy, the new medicament helps active forms of trachoma to heal up rapidly.

Our activities in virology, though now only in their first steps, have also led to promising results. Our virologists have begun to study the culture of the trachoma virus on tissue cultures, and its biological properties. They have also succeeded in isolating and identifying germs of epidemic and endemic conjunctivitis, partly responsible for the propagation of trachoma.

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The deep political, economic and social changes taking place since the regaining of independence have completely transformed the Vietnamese countryside and

served as a premise for a systematic and successful struggle against trachoma. Without attaining to abundance yet, the peasant in the DRVN has been none the less freed from famine and ignorance. He is no longer the peasant of former times, described by colonial authors as living in misery and want, a bag of bones clothed in rags stinking with sweat, with filmy eyes ringed with red from blepharitis... One can now see in any village light and well-kept houses instead of dark and damp huts, wells giving good clean water for daily consumption in place of pond water, double septic tanks which help to ward off the faecal peril and limit the proliferation of flies. Children no longer play in mud and dirt but are sent to the nursery of the farm co-op or the village school. Vietnamese ophthalmologists attribute their successes to those changes. The decisive victory over trachoma is not only the work of our anti-trachoma personnel and organization, but also that of other branches of activity, of our whole people, carried out under the clearsighted and irreplaceable leadership of the Workers' Party.

The general offensive against trachoma has not yet ended and there is still a lot to do before this social disease with numerous complications and tragic consequences is eradicated. But we are convinced that when the allowed time is ended, trachoma will have definitely disappeared from our country to become a disease of the past.

THE FIGHT AGAINST LEPROSY IN THE DEMOCRATIC REPUBLIC OF VIET NAM

Prof. Dang Vu Hy

An ubiquitous disease, leprosy does not spare any climate nor any race. Practically wiped out in advanced countries, it still causes great ravages in the Third World, affecting some 10 million people, half of whom are in Asia. Viet Nam is pinched between two big hotbeds: India with about two million lepers and China with perhaps one million. This affection, the most horrible of the "four incurable diseases" according to traditional beliefs, has occurred in our country since time immemorial.

As far back as the 14th century, in his treatise "The Miraculous Effects of Vietnamese Medicines" the famous physician-bonze Tue Tinh already described leprosy and proposed to cure it with a vegetal medicament. It was around that time that the first lazarets were set up in Viet Nam. Early in the 19th century, lepers were housed in "*duong te su*", asylums for the poor and invalid. They were later on resettled in separate villages, with their own administrations and worship places.

Under colonial rule, out of the twenty-million population of former French Indochina (Viet Nam, Laos and Cambodia), the leprologist Gaide estimated the total number of lepers at 12,000. According to Barbézieux, the morbidity rate was 1‰. The given figures were far below reality, as the colonial administration did not have enough specialist personnel nor enough means for mass tracking. The headman of each village was asked to report suspects to higher authorities and bring them by force to the provincial hospital for examination. The sick, frightened by this purely administrative method which gave rise to all kinds of abuses, tried their best to avoid being tracked out. In the isolation wards, inhuman living conditions and a regime of coercion prevailed.

After 1954, the health service of the DRVN took charge of the fight against leprosy north of the 17th parallel. The legacy bequeathed by colonialism was poor : two leper centres at Qua Cam and Van Mon which were rather agricultural colonies for lazars. All was to be re-started from scratch. It was necessary to reorganize these two centres, renew and humanize working methods in tracking, isolation and treatment of the sick and in prophylactic work.

Tracking, a Mass Job

Leprosy is a social disease. To combat it, there must be a series of combined social measures, involving many branches of activity and not only the health service.

Tracking, in particular, is a mass job and requires a mass line; it is a real politico-sanitary campaign in which administrative orders are excluded, for only patient explanations in both the medical and social fields can drive home to the population the necessity of a collective fight against this much-feared affection. First and foremost, it is necessary to explain to them the dangers of the disease and how to prevent it. Everyone must be assured of the humanitarian goals pursued, especially the sick and their relatives. In our country this complex and delicate task benefits by all the advantages of the people's regime. While relying mainly on the vast medico-sanitary network which covers the villages and extends to the remotest hamlets it is also carried out through the channels of administrative services and mass organizations, mobilizing political cadres, teachers, schoolboys, youth union members, etc. Health workers hold talks, exihibitions, distribute pamphlets on leprosy, etc. The effect produced by those *mass media*, so to speak, is multiplied by persuasion conducted in every family by the more enlightened of its own members.

After the stage of persuasion, the medical service organizes the examination of the whole population. In the countryside, examinations are preferably done outside periods of farm work. To overcome the shortage of specialist personnel — at the beginning, we had only one dermatologist for each province on an average— we adopt the method of "double echelon": first, nurses with some training in dermatology carry out preliminary examinations, dismissing apparently sound

people, keeping only those bearing skin lesions (about 10 to 20% of the population); then specialists come and examine those having skin diseases, pick out lepers and order supplementary examinations (if necessary, they also give treatment for skin diseases other than leprosy). A dermatologist assisted by three good nurses can dismiss 500 sound people and examine 50 sick persons in one day. One week would be enough for them to screen the whole population of a village of 3,000 inhabitants.

The tracking work was continued during the years of American bombing, from 1965 to 1968. Our health service had a lot of other work to do at the same time and it was necessary to advance quickly in every field. As leprosy propagates by seats, tracking teams concentrated their examinations on three kinds of subjects:

1. Identified lepers (iterative examination);
2. Their entourage; and
3. People suspected of leprosy by the population.

With only a minimum number of specialists and scanty means, we were able to carry on tracking on a large scale. Omissions, certainly unavoidable, are not frequent however, for examinations are repeated every year. Still the main thing is as soon as possible to find out contagious cases which are generally fairly easy to recognize.

Our dermatologists have so far been able to identify 12,000 lepers, including 2,000 contagious cases, on the present territory of the DRVN. In Hanoi and Haiphong they have discovered more than 2,000, mostly cases overlooked under the French occupation.

Segregation Rationalized and Humanized

Under colonial rule, the authorities' main concern was to prevent the lepers from getting into the major cities, where the French lived in large numbers. In Hanoi for instance, they were satisfied with driving lepers to the periphery, setting up some temporary asylums at first. Only after half a century of French "protectorate" in North Viet Nam, was the Qua Cam lazaret founded (1928), 30km from the capital city, and students came there to study leprosy. In late 1954, when our medical workers took over, it housed 638 sick people including 73 children. Of the 565 adult inmates, there were

164	people isolated	for 3	years
155	—	5	—
182	—	10	—
53	—	15	—
31	—	20	—
21	—	25	—
23	—	30	—
2	—	35	—
3	—	40	—

In fact, segregation was justified for only 133 of them. The rest were affected with benign forms for which ambulatory treatment would be largely enough. In the interest of the sick and their families, and also to make rational use of our still very limited means, we fixed a limit to segregation. Once cleared, the sick are released six months to one year after repeated negative bacteriological tests. The average duration of segregation was cut down to 3 years. Life in lazarets has

been completely reorganized. The aim is not only to make it more comfortable, but also and above all to normalize it so as to help boost the morale of the sick. Improved daily rations help increase their resistance to infection. They are encouraged to spend their long leisure hours taking part in some productive work, more particularly gardening and animal husbandry. Many, trained as nurses, are only too glad to look after their fellow-inmates. Others join in the fight against illiteracy or take charge of classes of complementary education as volunteer teachers. Cultural ensembles, which group mostly young men and girls, make music and art available and bring joy to all the inmates. Well-organized work, studies and recreations keep the sick from the blues. Far from having the bitter sentiment of being a useless burden for society, or worse of being abandoned, each of them confidently looks forward to the day when he will be cured and returned to the community of healthy people.

On taking over the lazarets, we were faced with an extremely painful situation. In each of them lived a hundred or so healthy children who had followed their mothers or had been born there. We gave them preventive treatment with BCG and DDS before getting them adopted, mostly by peasant families. New-born babies were sent to a creche within three days after their birth: as it was beyond our means to support them and considering their debility, we finally put them to nurse. Here again, our health workers and political cadres had a lot of persuasion work to do in order to get the consent of the older children, their mothers and the adoptive parents.

With the assistance of the brother socialist countries, we built a large lazaret at Quynh Lap (Quynh Luu district, Nghe An province) on a picturesque site at the seaside, away from all rural and urban populated areas. With its 160 wards, its laboratories and its treatment facilities, it could receive 2,600 patients and ranked among the largest treatment and research centres of its kind in the Far East. Apart from comfortable rooms for treatment and living, the inmates had at their disposal several club-rooms, a theatre and a special house for receiving their relatives. From 1960 to 1964, 4,000 lepers came and underwent treatment and over 1,000 were eventually cleared. This large medical establishment was razed to the ground by US planes in June 1965 after 39 day and night raids. US pilots even strafed crippled lepers who were trying to reach the shelters on their crutches or to hide in nearby ravines. In all, 176 inmates were killed and 150 others wounded. The remaining 2,000 had to be transferred to makeshift asylums.

In Search of a Simple and Inexpensive but Efficacious Treatment

In 1954 treatment in lazarets consisted simply of injections of ethylic ether of chaulmoogra, sulfones being distributed on a trial basis only to some isolated cases in Hanoi. The injections, very painful, so frightened the sick that many of them refused to be treated and it was no doubt one of the reasons that accounted

for their indefinitely prolonged internment. We at once replaced chaulmoogra oil by sulfones, already recognized as most active against the Hansen bacillus. As usual, we started with a campaign of explanation so as to acquaint the sick with the properties of the new product, the possibility of healing, the accidents to be prevented, etc. Then we got an activist elected in each group to take charge of distributing medicaments at fixed hours; thanks to a tight control on the taking of medicines the results were very encouraging. Each of our lazarets has been equipped with a bacteriological laboratory, a gift from the German Democratic Republic, which allows us to follow the progress of treatment. The sick man is sent back home as soon as he is cleared; put under the supervision of the provincial dispensary of dermatology, he comes there to get medicines free of charge and to be examined every three or six months.

A leper being traditionally regarded as doomed for life and as a horrible source of contamination, the rehabilitation of cleared subjects in public opinion constitute an extremely complex and delicate problem on which the success of the fight against leprosy depends. It is not always easy to combat prejudices that date back hundreds, even thousands, of years, and to make people accept the idea that this affection is curable, in both *theory and practice*. Our health service, with the confidence it has always inspired in war as well as in peace time, has eventually succeeded in inculcating the new conception.

Before sending a cleared leper home, a provincial health officer never fails to come and prepare public opinion in the village to this end, together with the village health and political workers. The rehabilitated subject is bound to get an adequate job, for instance as a livestock tender in a farm co-op. His fellow villagers, who have understood the problem, do their best to help him settle back in normal life as quickly as possible.

As regards treatment, we have tried several medicines at the same time. Of the 835 sick people at the Van Mon lazaret, after 24 months of treatment with DDS combined with INH, 528 were completely cleared, i. e. 63.26% (treatment by Dang Vu Hy and his collaborators). Those experiments have enabled us to fix standard doses for the whole country. Strong doses (400 mg, once every other day) advocated by Nguyen Canh Can have been successful, but views differ as to the advantage of this method. Some recipes of oriental medicine have also been put to the test. That of the famous physician Liu Ping-chang (Canton, China), which comprises 32 drugs, has led to encouraging results, but some prescribed products are practically not to be found in Viet Nam. Another, coming from traditional medicine and also including chaulmoogra, proved to be less efficacious than sulfones. Most recently, experiments have been made with cultures of *bacillus subtilis*, either in intravenous injection, by Dang Vu Hy, Nguyen Van Liem and the Qua Cam leprologists, or in blocking position round the lesions by Nguyen Kha Tri, but results have been unsteady. It is however interesting to see how well lepers stand intravenous injections of

bacillus subtilis, which have been made by the thousands for several years now, with hardly a case of shock. Subtilis disappears from the blood within two hours after injection. But Hansen bacilli remain for a long time in the nasal mucus and lesions.

To fight perforating forms, Tran Huu Ngoan has again resorted to plastered boots, but the results were not durable. It seems that disarticulation is the best method.

From the clinical point of view, Dang Vu Hy has studied the age at which the disease starts in 1,443 leprosy cases. In Viet Nam, the Hansen disease starts mostly between 10 and 20 years of age, at 14 for most cases. This fact suggests a study on the role of the endocrine glands and on the particular importance of prophylaxis for young people. Nguyen Tri Tue has made a complete summing up of various locations of the disease.

From the bacteriological point of view, Le Kinh Duc has demonstrated the predominance of Hansen bacilli in a certain layer of the skin and it is there that they must be primarily looked for. Studying 500 cases in collaboration with Nguyen Nguyen, the same bacteriologist has compared the percentage of positive searches for germs according to chemical varieties to objectify their potential contamination. Promising researches with the fluorescent microscope are under way.

Epidemiology has not been neglected. In Thai Binh, one of the most populous provinces in the Red River Delta, Nguyen Si Nghi has remarked that leprosy develops by seats ; in some villages, it affects as much as 3

or 4°/oo of the population, while being entirely unknown in others. One of the last mass trackings, effected in Ving Tuong district, Vinh Phu province, in 1958 revealed a rate of leprous morbidity of 1.7°/oo for a population of 36,000 inhabitants. It is generally believed that for the country as a whole this rate may vary between 2 and 3°/oo.

Falsely positive serological reactions in leprosy have been studied by the leprologists Dang Vu Hy, Huynh Kham and Vi Phac in collaboration with the bacteriologist Dang Duc Trach. Their study warns against some common mistakes in differentiating leprosy from syphilis.

The few scientific works which we have just cited among others give an idea of the activities of our leprologists who, while exerting their efforts in various directions, concentrate on one concrete and fundamental task : the search for a simple, inexpensive and efficacious treatment, suited to the requirements and possibilities of an under-developed country.

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Mostly trained in the country after the August 1945 Revolution and having worked for twenty-five years in a continuous state of war, our leprologists have shown unstinting devotion to the sick and have enjoyed well-deserved confidence. While material and technical conditions are still inadequate, we enjoy, in the organizational and moral domains, many advantages connected with our social system : the existence

of a thick medico - sanitary network in rural areas ; the elimination of illiteracy and the impetuous development of general education, the valuable assistance of other services... All those advantages have greatly helped us fulfil our arduous task, for the fight against leprosy is above all *the work of the masses*. We possess the advantage of having a Party which can mobilize the masses at every level and bring into play political and economic levers in favour of medical and social work.

With the means at our disposal and the experience we have gained, we hope that leprosy will have disappeared in the next 25 years, after five five - year plans.

THE CREATION OF A NATIONAL PHARMACEUTICAL INDUSTRY

Do Huu The
Pharmacist

In the early days of the DRVN, in 1945, with practically no industry and a backward agriculture, our pharmaceutical situation was an almost desperate one. Not a single drug factory, not a single laboratory worthy of the name. The pharmacies sold only imported medicines, and when their stocks were exhausted — all foreign trade having come to a halt — even such drugs of common use as aspirin, quinine, sulfas, could only be obtained at prohibitive black market prices. Then the country had to face a war of aggression which was to last until 1954.

The war, besides weapons and food, also required medicines and medical equipment. Our Health Service had to tackle this most important task : to organize pharmaceutical production rapidly and at all costs, despite the lack of know-how, technical personnel, equipment and materials. This was to be done on both a national and regional scale, with a view to " creating an on-the-spot logistic service ", which was the only way to meet the urgent needs of the civilian population as well as those of the armed forces.

To the innumerable difficulties left by colonialism were added others, not less serious, resulting from the war and enemy economic blockade. Yet, during the anti-French resistance we succeeded in gradually laying the foundation for a Vietnamese pharmaceutical industry which, ever since those early days, has mostly made use of local resources. After 1954, during ten years of peaceful construction, with the brotherly aid of socialist countries, this industry developed vigorously and became capable of meeting the principal needs of the country. US aggression, far from hampering its development, stimulated it even in remote regions, and brought into being a series of small local drug factories besides the central factories. Thus, thanks to twenty-five years of intense efforts, the DRVN has established its own pharmaceutical industry, essentially by its own means and through a rational use of foreign aid. This is a long and arduous struggle which may be divided into three stages: the early stage, during the anti-French resistance (1945-1954); the peace-time development (1955-1964); the development of regional industries in face of US aggression (1965-1968).

Born in the Fire of War

In the early days of the resistance against French aggression (1945-1954), shortage of medicines was most severe, and this penury was most cruelly felt at the front. Patients in a malarian fit were given half a

tablet of quinacrine, the purpose of which was to help boost their morale rather than cure them. The wounded were operated on on the very battlefield without any anaesthetic, and blotting paper and dried banana leaves were used in place of absorbent cotton-wool and bandage. This explains why pharmaceutical production, at first with a handicraft character, was started by the People's Army. Then it was also taken up by the civilian Health Service and became a separate branch.

The problem that faced us was an arduous one, in a country bled white by a century of colonization, militarily encircled and cut up, what could we do to have a minimum of medicines, vaccines and medical equipment for civilian as well as military use? For we had to protect the health not only of the combatants but also the workers in the rear area during a long and murderous war. There could be only one solution: to rely on our own efforts and make the most of our own resources.

That was the general direction set forth by the Government for medico-sanitary work, which ever since has guided the activities of our technical personnel. With great ingenuity, they overcame countless difficulties, and with makeshift means turned out a large variety of surgical instruments and indispensable medicines. Handicraft workshops deep in the jungle made scalpels, scissors, hemostatic pincers with steel retrieved from railway tracks. Stainless steel hairpins were made into hypodermic needles, stays from discarded umbrellas were filed into surgical

needles. Scales made of bamboo gained relative precision, thanks to the method of double weighing. Perforated iron sheets then hand presses were used for making tablets. As lead tanks were unobtainable, terra-cotta cauldrons were used for making ether, and stills made from odds and ends distilled high-grade alcohol.

In this way, we succeeded in making anaesthetic ether as early as 1947 and, from 1949, chloroform to replace the former, which is too inflammable, surgical operations being carried out by the light of kerosene lamps. We also made glass for ampoules, plaster for orthopaedic treatment, refined salt and glucose for the preparation of isotonic and hypertonic serums. Chlorophyle was extracted from bamboo leaves and, antibiotics being extremely rare in those days, we made penicillin filtrates for the treatment of war wounds.

Local medicinal plants gave us very useful replacement products. To replace quinine and quinacrine we manufactured anti-malaria drugs from *Dichroa febrifuga* leaves, *Alstonia scholaris* bark and *Kinospora crispa* liana. Active elements, such as tetrahydropalmatine, cafeine, morphine and strychnine were extracted respectively from *Stephania rotunda*, *Thea sinensis*, *Papaver somniferum* and *Strychnos*. Camphor and eucalyptus oils were obtained from the distillation of *Cinnamum camphora* and *Eucalyptus*. These products were in great demand both at the front and in the rear.

Particularly in the South, our physicians and chemists joined efforts to prepare Filatov biostimulins

whose therapeutic possibilities were greatly increased. The application of traditional recipes and the use of local pharmaceutical materials made it possible to remedy the shortage of medicines to a large extent.

The Public Health Ministry paid particular attention to the preparation of vaccines. Despite extremely hard jungle working conditions, its Microbiology Institute managed to produce on a large scale anti-rabies, anti-smallpox, anti-cholera and anti-typhus vaccines; and as a result of mass vaccinations, apart from sporadic cases which were rapidly jugulated, no epidemics were known in the free zones during the nine years of war. It should be noted that several smallpox and cholera epidemics broke out in enemy-occupied zones where in some instances, mobile medical groups of the Resistance had to come secretly to carry out mass vaccinations.

By 1951 pharmaceutical production had been systematically organized on a national scale, though it still bore a handicraft character. Besides the central enterprises, each war zone was capable of producing pharmaceutical products, absorbent cotton-wool and bandages, medical instruments; each had its own glassware factories, microbiology laboratories, drug laboratories... The vast state-owned network was strengthened to some extent by private or cooperative enterprises. The large numbers of traditional medicine practitioners in the countryside also contributed a most important part to the mobilization of national therapeutic resources.

Thus foundations were laid for the DRVN pharmaceutical industry, and a general orientation was laid down to ensure its development in the next stage.

Peace-time Development

With the restoration of peace and the beginning of socialist industrialization, new prospects were opened to the pharmaceutical industry.

Public health was in a critical state. The population was exhausted after years of war. Besides, the French expeditionary corps on leaving the country had left in the zones formerly under its control many social diseases, particularly tuberculosis, trachoma, leprosy and venereal diseases. Our Health Service also had to take care of hundreds of thousands of persons who were in dire need of medical care—political cadres and combatants of the People's Army regrouped from the South in implementation of the Geneva Agreements, especially the sick and the wounded. The situation was further aggravated by the floods of 1955, typhoons and bad harvests. Medicines were in great demand, the more so as in the zones formerly under enemy control, all medicines had had to be imported from France.

Imperialist encirclement had been broken and the DRVN was now linked with the socialist camp. Generous aid poured in from the brother countries, which made it possible to rapidly heal the wounds of war. But as in all other fields, we must rely essentially though no longer solely on our own resources. We asked

the brother countries to provide us mainly with equipment and technical aid. Our aim was to build up a specifically Vietnamese pharmaceutical industry capable of producing indispensable medicines and medical instruments, by making the most of our technical possibilities and national resources, without neglecting other countries' scientific and technical acquisitions.

Early in 1955, small pharmaceutical enterprises, scattered during the anti-French resistance, were regrouped into a complex in Hanoi, which comprised production lines of modern pharmacy and traditional pharmacy turning out an ever greater variety of drugs in different forms : potions, tablets, pills, sugar-coated pills, ointments, injectable ampoules...From 1961, a reverse process took place when we had reached a stage of development which required specialization. Different sections were detached from the complex to become autonomous enterprises. A chemical pharmacy factory came into being and to complement it, one of traditional medicines. Factories specialized in either modern or traditional pharmacy rapidly multiplied. To make them self-sufficient in raw materials they have been provided with laboratories for chemical synthesis and biological synthesis and for the extraction of active elements from local plants and animals. (Part of the raw materials used is supplied by local chemical factories and the remainder through imports.) Special glassware factories make glass for ampoules, phials, laboratory equipment. Medico-sanitary equipment factories manufacture surgical instruments and other equipment and apparatuses for hospitals and pharmacies. We must also mention

the different laboratories under the Hygiene and Epidemiology Institute, the Oriental Medicine Institute and the Materia Medica Institute, which produce respectively, on a large scale, vaccines and anti-serums, various traditional drugs which have been successfully used in hospitals, and samples of new pharmaceutical products made from local medical materials.

Except one pharmaceutical factory built with Soviet aid, all factories and laboratories, big and small, have been built and equipped by ourselves to meet the requirements of our own production methods.

The stage of peaceful construction from 1955 to 1964 saw an unprecedented development of our pharmaceutical industry, whose global production increased 25 times in ten years. This production was in fact much more important, for apart from the industrial, semi-industrial and handicraft pharmaceutical enterprises under the central authorities, each provincial or district hospital could produce salt or glucose serums and common traditional drugs, while the 6,000 village health stations have each a section of traditional medicine where the patients are treated with local medicinal plants. This omnipresent pharmaceutical organization which parallels the medico-sanitary network from the central to the basic level, has made it possible to make the most of the country's possibilities; otherwise it would be impossible to satisfy the people's growing needs. We have endeavoured to turn to account both the acquisitions of modern science and technique and traditional recipes and national resources. This scientific and national character has

made this pharmacy popular and adapted it to our present economic possibilities. Great efforts have been made, on the one hand, to increase production and, on the other hand, to find new medicinal materials and new medicines for both treatment and prevention. In this field too, we have turned chiefly to the national heritage, seeking to profit by our fathers' experience in a systematic and scientific way. While before 1960, our pharmaceutical industry had only sought to satisfy immediate needs and a public more or less inclined to use modern medicines, after that date, it has strictly followed the general orientation defined by the Public Health Ministry and, in coordination with other branches, has been guiding the sick toward the use of appropriate traditional medicines. Medicines made from local raw materials constituted 40 per cent of the global production in 1960, and 57 per cent in 1965. Before 1960, 40 per cent of these medicines were tonics, and only 60 per cent were used in prophylaxis and treatment. The latter proportion reached 80 per cent by the end of 1964.

Many medicines have been put on sale, such as the different *cao*, extracts from the bones of wild animals or from medicinal plants, anti-diarrhoea tablets of *To moc (Caesalpina Sappan)*, *Ich Mau* tablets used against dysmenorrhea made from *Leonurus heterophyllus*; *Rutin* tablets made from *Sophora japonica*; *Iodosoja* tablets for the treatment of goitre; *Phytin* granules made from rice bran; capsules of chenopodium oil; *Filatov* biostimulin preparations, for injection or oral use; *Subtilis*, *Dextran*, and injectable salt water preparations,

etc. Chemical pharmacy products of local origin have also appeared, such as benzoic acid, natrium benzoate, phosphates and glycerophosphates, terpene, palmatin, etc.

We have become self-sufficient in monovalent and polyvalent anti-toxic serums and in vaccines against cholera, typhoid fever, tetanus, diphtheria, whooping cough, rabies, etc. On the basis of scientific and technical data supplied by the Poliomyelitis and Viral Encephalitis Institute of the USSR Academy of Medical Sciences, we have succeeded in producing Sabin-Shumakov live anti-poliomyelitis vaccine. Dead BCG vaccine preserves all its immunologic properties while requiring no complex and expensive equipment, in both preparation and use.

Our medico-sanitary equipment factories are now capable of supplying operation tables, dentist's chairs, various instruments for general and special surgery, autoclaves, sterilizers, tensiometers, etc. Neutral glass, made from local materials, meets the requirements in glassware of hospitals, laboratories and pharmacies.

In Face of US Aggression

For US airmen hospitals and pharmaceutical depots constituted choice targets; the Yankee aggressor clearly sought to deprive the civilian population of the necessary medical care and subdue them physically and morally by indiscriminate bombing.

In face of the new situation a firm directive was given: to produce enough medicines at all costs to meet the rapidly increasing needs of the civilian population and the armed forces. It was a vital question both for normal health protection and for wartime emergencies. Successfully solved, it would contribute an important part to victory. These familiar slogans were again stressed: "To rely mainly on our own strength", "To obtain supplies on the spot!" Each locality was to make the most of its therapeutic resources and to ask from the higher level only the more important articles which it could not produce by its own means.

Learning from the experience gained during the anti-French resistance and relying on the widespread medico-sanitary network set up during ten years of peace, we promptly decentralized our pharmaceutical production. The central factories and workshops were broken up into a host of autonomous enterprises scattered throughout the countryside and the mountainous areas, with a view to reducing to a minimum the damage caused by enemy air forces. At the same time we rapidly built a network of small provincial pharmaceutical factories with adequate equipment for the manufacture of common medicines, using local plants and animals and some indispensable chemical products supplied by the central pharmacies. Our factories at the central and provincial levels endeavoured to restrict the preparation of liquid medicines, which required glass containers and special care in transportation; they were replaced whenever possible by tablets, pills, powder..., which were more easily transported and stored, and

could be effectively protected against rain water and humidity by polyethylene bags. On-the-spot preparation of bidistilled water and artificial serums (isotonic and hypertonic) in the districts and that of traditional drugs in the villages relieved the central and provincial pharmacies of a considerable part of their tasks. Thanks to this organization of our pharmaceutical production, we were able to supply medicines and emergency equipment to all our 5,913 villages, in the mountainous regions as well as in the delta, and even in the most savagely attacked provinces.

Our workers and technicians simultaneously engaged in production and fighting. They toiled selflessly in order to raise productivity in extremely difficult conditions: enemy bombing often hampered the supply of food and raw materials and practically prevented all equipment replacement. During air raids, our workers took up combat positions and shot at enemy planes with rifles and machine-guns. The self-defence unit of a factory thus brought down a F.105 Thunderchief. By dispersing our factories, camouflaging them and keeping their emplacements secret, we succeeded in preserving nearly all our production centres, all of which achieved and even exceeded their yearly production targets.

The annual value of production in the war years, in comparison with that of 1964, was as follows:

1964	100
1965	171
1966	200
1967	230
1968	250

The annual productivity growth rate was 16% for the central enterprises and 57% for the regional enterprises. The percentage of global production contributed by the latter was 18% in 1964 and 40% in 1968. The value of medicines produced in the country, from 3 *dongs* per head of population in 1964, rose to 6 *dongs* in 1968.

In four years of war, the quantity of medicines made from local medicinal materials was twice as large as in all the 10 years of peace. A thorough study of local medicinal plants led to the creation of 40 new drugs, particularly a condensed extract and tablets of *Ba gac* (Rauwolfia verticillata), a drug against high blood pressure and a tranquillizer; a condensed extract of *Bach bo* (Stenemona tuberosa) against cough; a condensed extract of *Nhan tran* (Acrocepholus capitatus) for the treatment of hepatitis; *Rong mo* (Sargassum Sp.) tablets for treatment of goitre; tablets of *Ich mau* (Leonurus heterophyllus), *Huong phu* (Cyperus rotundus) and *Ngai cuu* (Artemisia vulgaris) used against dysmenorrhoea; tablets against allergic affections, prepared from *Kim ngan* (Lonicera japonica) and *Qua ke* (Xanthium strumarium); tablets of *Hy thiem* (Siegesbeckia orientalis) for the treatment of rheumatism; of *Nho noi* (Eclipta alba), hemostatic and anti-inflammatory; various powders used against snake bites; NT9, an anti-shock medicine; tonic wines containing extracts of *Tam that* (Panax pseudo ginseng) and of *Ngu gia bi* (Acanthopanax)...

Besides these preparations which use total extracts in relatively simple pharmaceutical forms, research

work in vegetal chemistry has allowed us to extract a certain number of active elements such as neriolin, conessin, strophanthin..., respectively from the *Truc dao* (Nerium oleander), *Muc hoa trang* (Holarrhena antidysenterica), *Cay sung trau* (Strophantus divaricatus)... (*)

Our chemical pharmacy too has exerted tremendous efforts to prepare from local resources nearly all products of prime necessity. To cite only a few examples, we have succeeded in producing by synthesis INH, Phtalasol, Piperazin, calcium gluconate, vitamin B12, etc. to meet part of our requirements in these products.

With a view to preventing and fighting against epidemics, we have solved the problem of massive production of dry vaccines, bacterial and viral antigens and antiserums used in diagnosis of microbial and viral infections.

We have overcome difficulties created by a hot and wet climate by devising a complex apparatus to ensure complete asepsis in putting antibiotics and Subtilis into ampoules.

Thus, during four years of an unequal but victorious fight, the DRVN far from being "bombed back to the Stone Age" by US aircraft, succeeded in increasing the production of goods and equipment to meet our increased war-time needs. Our pharmacy workers have made a worthy contribution to the common victory by fulfilling the strategic task assigned to them. Owing

(*) See below: "The Revalorization of Our Traditional Pharmacy" by Nguyen Van Dan.

to their efforts, even in the remotest and most severely tried areas, our medical personnel have been provided with sufficient means to treat the sick and the wounded and to wage a systematic fight against social diseases and epidemics.

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Our national industry, still in its budding stage, naturally does not allow us to create miracles. We have only endeavoured to mobilize to the utmost our material, technical and moral potentialities with a view to building up a scientific, national and popular pharmacy capable of contributing to socialist medico-sanitary work, in an economically under-developed country ravaged by successive wars of aggression.

Born in the fire of war, our pharmaceutical industry has sought in the first place to satisfy the immediate needs of therapeutics and war emergencies; at present, it effectively serves the planned struggle against social diseases and especially prophylaxis which occupies the foremost place in our medico-sanitary tasks.

With respect to chemical pharmacy, we began with rudimentary handicraft methods and gradually came to more complex processes. We have endeavoured to make the most of the acquisitions of modern pharmacology and adapt them to national conditions.

We have concentrated our efforts on giving a new value to our traditional pharmacy in the light of modern science, doing research particularly in vegetal chemistry and biosynthesis.

For the coming years, we intend to develop the culture of medicinal plants and breeding of animals for medical purposes; to intensify the extraction and the study of vegetal active elements; to provide our factories and laboratories with modern equipment for large-scale manufacturing of medicines from local medicinal materials and by biosynthesis. These are the three main points of a long-term plan which is to serve as a basis for the further development of pharmaceutical industry in the DRVN.

THE REVALORIZATION OF OUR TRADITIONAL PHARMACY

Nguyen Van Dan
Doctor of Pharmacy

Viet Nam's Old Pharmacy

Situated in monsoon Asia, Viet Nam has a hot and damp climate which, together with her varied relief and soil, is conducive to the growth of a rich flora and fauna. According to recent data, there exist on the present territory of the DRVN 5,600 vegetal species including about one thousand medicinal plants grouped in 160 families.

Our traditional pharmacopoeia dates from thousands of years back. From time immemorial, our people have known how to use the country's abundant natural resources to cure diseases, while cultivating and breeding vegetal and animal species that yield medical substances.

As early as the 14th century, the famous physician-bonze Tue Tinh compiled a collection of recipes entitled *Nam Duoc Than Hieu* (The Miraculous Effects of Vietnamese Medicines). In the 18th century, the eminent physician Lan Ong gathered the most efficacious recipes in a medico-pharmaceutical treatise, *Y Ton*

Tam Linh (General Principles of Medicine). Old medicaments to heal wounds, in particular, proved to be of great help during the many wars of resistance to foreign aggression. They were successfully applied by the medical establishments of Duoc Son-Van Kiep under the guidance of Generals Tran Hung Dao and Pham Ngu Lao, who defeated the Mongol invaders in the 13th century. During the resistance against the French colonialists (1945-1954) and the present resistance to US aggression, our civilian and military medical services have always set great store by local medicines and traditional cures.

Under colonial rule, the medicine and pharmacopoeia bequeathed by our fathers were literally cast aside by the administration as well as by physicians and pharmacists trained in French schools. But they nevertheless continued to occupy an honorable position, primarily in the countryside utterly deprived of modern medical facilities. They constituted a necessary supplement to the latter in the cities,where great physicians of the traditional school were honored even among the most Westernized intellectual circles.

Since its establishment, the people's administration has paid particular attention to the revalorization of the national medico-pharmaceutical treasure. In this respect, the Viet Nam Workers' Party's policy can be summed up in this recommendation by President Ho Chi Minh to the health workers:

"Our fathers had rich and precious experience in curing diseases with Vietnamese and Chinese medicines. To widen the scope of our medicine, you must attach

great importance to the study of traditional medicine, and try to combine it with modern medicine."

The Efforts of the People's Administration

For fifteen years now our physicians and pharmacists have confidently followed this path. They have been trying to introduce the best achievements of the national heritage and of world science into the medical science of socialist Viet Nam. With the active participation of practitioners of traditional medicine and that of the masses, they have managed to gather a large number of valuable old documents scattered throughout the country, then to study them closely and critically in the light of modern science.

Since 1960 especially, an important work of inquiry and research has been conducted on a national scale with a view to cataloguing the materia medica used in popular recipes, establishing their pharmacological properties and their geographical distribution. Even in the period of the most violent US raids, this job received a strong impetus which it has kept ever since, serving as a basis for a rational exploitation of our natural medical resources and also for the planned cultivation and breeding of vegetal and animal species yielding raw materials with curing properties. State purchases of those materials have increased every year, which has enabled us to promote drug manufacturing and meet the mounting needs of the population.

Our researches are based on a fruitful mass line, combining popular experience with modern pharmacological science, guarding against empiricism on the one hand and scientific "vanguardism" on the other. We enjoy the assistance of the people, Party organizations and people's administration, and have achieved close co-operation between various services: pharmacy, medicine, forestry exploitation, agriculture, etc. Scientific workers scoured the country to consult practitioners of traditional medicine and collect old recipes. From 1967 to 1969, they managed to catalogue local materia medica in 24 provinces out of 25. In the highlands, many districts and villages have been able to make an inventory of their pharmaceutical resources, and Tuyen Quang province in particular, with its 5 districts and 153 villages, has completed this task on the whole of its territory. According to statistical data from Hai Hung province (formerly Hai Duong and Hung Yen), in the Red River Delta, each of its 403 villages harbours from 100 to 300 species of medicinal herbs.

The Institute of Materia Medica at present has been able to chart the distribution of medicinal resources in the country and evaluate approximate reserves. Between 1961 and 1969, it studied hundreds of recipes in their many variants with 3,565 samples, catalogued the 1,030 species so far known in the DRVN with their common names, their scientific names and their pharmacological properties, and established the florescence and fructification periods of 640 common species. Its experimentation garden at Van Dien (on the outskirts of Hanoi), which acts as a pilot centre for the whole

country, cultivates over one hundred species to supply seeds and over 400 others to supply samples.

Among the collected medicinal plants, the most widespread are: *Tien ho* (Peucedanum praecuptorum Dum), white-flowered *muc* (Holarrhena antidysenterica Wall), *sung de* (Strophantus divaricatus H. and A.) *sung trau* (Strophantus candatus Kurz), *co dai* (Milletia Sp.), one-flowered *bay la* (Paris polyphylla Sm.), wild *tam that* (Panax bipinnatifidus Seem), *mo qua* (Cudrania obovata Trecul.), *ba gac* (Rauwolfia verticillata Lour.), *mot la* (Nervilis fordii Shltr.), wild *thuong luc* (Phytolacca sp.), *hoang lien o ro* (Mahonia sp.), *hoang lien ba gai* (Berberis Wallichiana D.C.), *ngu gia bi gai* (Acanthopanax aculeatus Seem), *den trang* (Xylopia pierrei Hance), *dang sam* (Codonopsis sp.), red *ha thu o* (Polygonum multiflorum Thunb.), *man kinh* (Vitex trifolia L.), *tuc doan* (Dipsacus asper Wall), *ba kich* (Morinda officinalis How.), *kim ngan* (Lonicera japonica Thunb.), *ma tien* (Strychnos sp.), *hoang nan* (Strychnos gauthierana Pierre), *thien mon dong* (Asparagus lucidus Lindl), *da cam* (Oldenlandia capitellata Kunth), *son binh lang* (Areca laosensis), *su quan* (Quisqualis indica L.), *chi tu* (Gardenia florida L.), *ban ha* (Typhonium trilobatum L and Schoot.), *bo chinh sam* (Hibiscus sagittifolius Kurs), etc. One should add a wide gamut of plants yielding essential oils, especially *choi* (Baeckea frutescens L.), *tram* (Melaleuca leucadendron L.), *bach dan chanh* (Eucalyptus citriodora L.) etc. which grow wild over thousands of hectares.

Thousands of tons of materia medica comprising 300 items have been exploited for home consumption and

export, such as: *thien nien kien* (Homalonema aff. sagittaefolia Jung.), *qua lau nhan* (Trichosanthes sp.), *ty giai* (Smilax sp.), *cot toai bo* (Drynaria fortunei J. Sm.), *hoang dang* (Fibraurea tinctoria Lour.), *o duoc* (Lindera strychnifolia Willd.), bird's-foot *ngu gia bi* (Schefflera octophylla Harms.), *bach bo* (Stemona tuberosa Lour.), *tho phuc linh* (Smilax glalera Roxb.), *huyet giac* (Pleomele cochinchinensis L.), *cau tich* (Dicksonia barometz J.Sm.), *hoang nan* (Strychnos gauthierana Pierre), *cot khi* (Polygonum cuspidatum Sieb and Zuoc.), *binh voi* (Stephania rotunda Lour.), etc.

State enterprises and co-operatives devote thousands of hectares to the cultivation of aboriginal medicinal plants, such as *ich mau* (Leonurus heterophyllus L.), *cay dau giun* (Chenopodium ambrosioides L.), *trach ta* (Alisma plantago-aquatica L.), *sinh dia* (Rehmannia glutinosa Libosch), *do chinh sam* (Hibiscus sagittifolius Kurz), *hoai son* (Dioscorea persimilis Prain Burkill), *y di* (Coix lachryma jobi L.), cinnamon, *huong nhu trang* (Ocimum gratissimum L.), *hoi* (Illicium verum Hook,), *sa* (Cymbopogon citratus Stapf.), etc.

During the last ten years, the Institute of Materia Medica of the DRVN has experimentally planted 256 foreign medicinal species belonging to 172 genera and 40 families. It has succeeded in acclimatizing about a hundred plants of great value, such as : *sinh dia* (Rehmannia glutinosa Libosch), *do trong* (Eucommia ulmoides Oliv.), *hoang ba* (Phellodendron amurense Rupr.), *cam thao bac* (Glycyrrhiza glabra L.), *bach chi* (Angelica dahurica Benth.), *huyen sam* (Scrophularia ningpoensis Hemsl.), *nguu tat* (Achyranthes bidentata Bl.), *tam that* (Panax pseudo-ginseng Wall.), *dang sam* (Codonopsis pilosula Nann.), *duong quy* (Angelica sinensis Diels.), *bach thuoc* (Paeonia albiflora Pall.), *bach truat* (Atractylis ovata Th.), *phu tu* (Aconitum fortunei Hemsl.), Solanum aviculare L., Rauwolfia serpentina Benth, Strophantus Kombe, European and Chinese mints, etc.

Acclimatization is particularly successful in the mountainous provinces with species of the Compositae, Umbelliferae, Labiatae, Scrophulariaceae and Campanulaceae families, which show great vigour and abilities of adaptation, giving abundant seeds in spite of a rainy climate with a high degree of moisture.

Our traditional pharmacopoeia does not neglect the rich gamut of animal products : tiger bone, deer antler, bear bile, boa bile, etc. We have organized the rearing of monkeys (on islands), of deer, bees, snakes, oysters, and, on a trial basis, geckos.

Traditional pharmacy has received a new impetus resulting from the close combination of modern with traditional medicines on a national scale, not only at the national, provincial and district levels, but also and primarily at village level. Each of the 6,000 village health stations has its section of traditional medicine and pharmacy, with its garden of medicinal plants and its equipment for preparing drugs. It is usual for a peasant family to devote a patch of land to the cultivation of at least a dozen of the 58 so-called "family medicine" species, which provide for part of the family's needs while bringing in some extra income, as the State organizes the purchase of materia medica even from the remotest places. A large number of villages have thus

been able to become self - sufficient in essential medicines, putting into effect the slogan for " on - the - spot supply " which helped us to face the 1965-1968 US aggression victoriously. Drawing successfully on popular experience, we have prepared drugs for snake bites, gastric pains, liver complaints, some gynecologic affections, rheumatisms, obliterating arteritis, etc. Many traditional medicines have been industrially manufactured in our central or local pharmaceutical factories.

The First Successes

Researches on national materia medica have helped to enhance the prestige of our traditional medicine and pharmacy and at the same time enrich modern medicine and pharmacy. Of the 450 vegetal and animal curative substances most widely used in traditional medicine, 120 are commonly prescribed by medical workers of the new school. Fifty formulae drawn from old recipes are at present applied by 30 central and local pharmaceutical factories in mass production of medicines based on local materia medica, many of which are in great demand on the national market, such as *to moc* (Caesalpinia sappan L.) used against diarrhoea, *rong mo* (Sargassum Sp.) for goitre, *ba gac* (Rauwolfia verticillata Lour.) for high blood pressure.

One of our most important achievements in the pharmaceutical field lies in the fact that we have managed to extract active elements from vegetal species. Let us cite, among others :

— heart-tonic glucosides : D-strophanthin, neriolin, corchoroside ;

— drugs for hypertension, especially alkaloids from *ba gac* (Rauwolfia verticillata Lour.) reserpin, ajmalicin, serpentin, etc.

— sedatives and tranquillizers : rotundin, tetrahydropalmatin, tetrahydrojatroricin ;

— anti-allergic drugs, especially nunacin ;

— anti-microbial drugs : palmatin, jatroricin, berberin ;

— anti-amoebian drugs : conessin and other alkaloids from white-flowered *muc* (Holarrhena antidysenterica Wall) ;

— vermifuges : ascaridol, embelic acid.

Let us mention also a whole range of widely used products, such as morphin, codein, narcotin, strychnin, camphor, terpene, phytin, essential oil from chenopod (chenopodium ambrosioides L.), aromatic oils from the camphor-tree, cinnamon, *khuynh diep* (Eucalyptus globulus L.), *tram* (Melaleuca leucadendron L.), *choi* (Baeckea frutescens L.), white *huong nhu* (Ocimum gratissimum L.), *hoi* (Illicium verum Hook.), *sa* (Cymbopogon citratus Stapf), *mang tang* (Litsea citrata Bl.), etc.

Our research workers have discovered rotenone and rotenoids, which can be used as insecticides, in some species of papilionaceous leguminous plants in the country, and vilblastin, which is being tried against cancer, in the leaves of the Vietnamese periwinkle (Vinca rosca L.).

Some of the most popular medicinal plants have been submitted to chemical and pharmacological studies, especially *nho noi* (Eclipta alba Hassk), serving both as hemostatic and antiseptic; *kim ngan* (Lonicera japonica Th.), *ke dau ngua* (Xanthium strumarium L.) and *beo cai* (Pistia stratiotes L.), effective against allergic affections; *nhoi* (Bischofia trifoliata Hook.) and *ich mau* (Leonurus heterophyllus L.) used in gynecology; *mo qua* (Cudrania obovata Trecul.) and *to moc* (Caesalpinia sappan L.) with anti-microbial properties; *co dai* (Milletia Sp.), effective against flies...

The tonic plants already studied strike us by their diversity and their originality. Let us mention, among others, the rich family of *ngu gia bi* (Araliaceae) with *dinh lang* (Polyscias fruticosa Harms.), *tam that* (Panax pseudo-ginseng Wall), bird's-foot *ngu gia bi* (Schefflera octophylla Harms.), *thong thao* (Tetrapanax papyrifera Hook.)...They are completed by a whole range of animal products: gecko, deer antler not yet ossified, deer tendons, tiger bone, monkey bone, etc.

Among the anti-allergic and anti-inflammatory drugs which have given proof of their efficacy, let us mention *kim ngan* (Lonicera japonica Th.), *ke dau ngua* (Xanthium strumarium L.), *beo cai* (Pistia stratiotes L.), *don mat troi* (Excoecaria bicolor Hassk.), *nuc nac* (Oroxylum indicum Vent.). Other species are being studied, which promise new possibilities in the treatment of allergic and inflammatory affections.

Other medicines, widely appreciated, are the depuratives and anti-intoxicants made from *sai dat* (Wedelia calendulacea Less.), *bo cong anh* (Lactuca indica L.) and *voi voi* (Heliotropium indicum L.).

Many of our drugs have proved to be efficacious against diseases refractory to modern treatment, especially obliterating arteritis, nephritis, hepatitis, heart and joint rheumatisms, cirrhosis.

Encouraged by the first successes achieved, our research workers and practitioners are working to widen the range of traditional medicaments so as to help wipe out or check epidemics, social diseases, infectious and parasitic ailments. Their present program of action includes the fight against tuberculosis, malaria, goitre, parasitic worms, diarrhoea, gynecologic diseases, old age complaints, etc.

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The revalorization of our traditional pharmacy has been possible thanks to a national, scientific and popular policy in medico-sanitary work, which advocates the close combination of traditional medicine with modern medicine. Resting on a scientific basis, it has made it possible to mobilize the vast local medicinal resources in the fight against diseases, innumerable on account of the climate and prolonged under-development. It is by increasingly tapping national possibilities that we have been able to carry out a large-scale health program in the conditions of a poor country, ravaged by successive wars of aggression, while relying *mainly* on our own forces. Our physicians and pharmacists have

endeavoured to make the most of the nation's resources in all the fields of medicine and pharmacy, in therapeutics, prophylaxis and in the treatment of war wounds. The point is, first of all, to find efficacious but simple remedies that are within reach of everyone, that are best suited to the country's conditions and the physical constitution of the Vietnamese. We also hope to contribute our part to enriching modern pharmacopoeia at a time when the making of synthetic drugs tends to drive popular experience and the exploitation of medicinal materials of vegetal and animal origin into oblivion.

MEDICAL RESEARCH IN THE DRVN
Orientation and Organization

Dr Hoang Dinh Cau

General Line of Medical Research

In an economically under-developed country like the DRVN, which during the last twenty-five years has had to defend itself against uninterrupted foreign aggressions, medical research faces innumerable difficulties.

The key question in the development of medical research is to have an appropriate general line. For many years, this general line may be summed up as follows :

. Medical research must serve the objective of the Public Health Service and help carry out its main immediate tasks. It also has a utilitarian objective and must serve the immediate interests of the political, social and economic revolution. In the years following the August 1945 Revolution, while the war was raging, the urgent question was to liquidate cholera and smallpox epidemics which were a serious threat to the population. The most effective means

must be found to eliminate these dangerous epidemics. The microbiology institutes of those days, working in the jungle in most difficult conditions, had to work out a method of preparing anti-smallpox and anti-cholera vaccines. Thanks to a technique adapted to jungle conditions, our microbiologists succeeded in preparing enough anti-cholera and anti-smallpox vaccines for massive vaccination. Thus in the free zones, smallpox and cholera were liquidated, while in areas occupied by the French expeditionary corps these diseases existed in an endemic state, with epidemics breaking out periodically and taking heavy tolls (for instance, the smallpox epidemic which erupted right in Hanoi and the surrounding areas in 1954 made some 5,000 victims).

The years 1959-1960 were particularly difficult for the Health Service because of an infantile poliomyelitis epidemic which caused some panic among the population. The Hanoi Institute of Hygiene and Epidemiology was then urgently entrusted with preparing anti-poliomyelitis vaccine. Learning from the experience of other countries, particularly the USSR, our microbiologists succeeded in producing the Sabin-Shumakov vaccine. Since 1961, millions of children have been vaccinated every year and this terrible epidemic has been eradicated (see Table 3).

At present, mass vaccination is carried out with polyvalent vaccines and by intradermic injection. This technique is simple, efficacious, economical, and causes no troublesome reactions.

Early in 1965, to cope with the war of destruction waged by the USA, a research group rapidly studied the action and effects of US air raids, and worked out a health strategy which proved to be effective, despite the relentless intensification of the bombing (Table 1), and the use of increasingly destructive weapons (Table 2).

Table 1. Number of people wounded yearly, showing the intensification of the bombing.

Regions Attacked	1965	1966	1967
H.T.	100	196	126
B.T.	100	348	429
Q.N.	100	657	1,201
T.H.	100	161	233

Table 2. Average number of persons wounded or killed by US bombing, per raid.

Regions attacked	wounded			killed		
	1965	1966	1967	1965	1966	1967
H.T.	0.44 person	0.36	0.61	0.95 person	0.16	0.31
B.T.	5	13.5	2.9	7.5	7.5	1.1
H.N.		33	28		15	6.5

Wounds caused by steel-pellet bombs, rockets, explosive bombs, burying by blast, burns by phosphorus and napalm, shock, infections, etc., were matters for study right from the beginning of the war. The solution of these problems allowed the surgical services to steadily reduce the mortality and invalidity rates.

2. Medical research must be adapted to the economic and social conditions of the country. As everybody knows, modern medical research requires many well-trained cadres, expensive equipment, etc., conditions which are not easily met in new countries. This explains the exodus of researchers from developing and even developed countries to the richer countries.

Animated by ardent patriotism, the scientific workers of the DRVN, who have also been dreaming of working conditions comparable to those in advanced countries, endeavour to realize their dream in their own country, in order to better serve their people. While actively preparing for the future, they have to adapt their work to present working conditions and seek to continuously improve them despite war-time difficulties. Our medical research cannot yet tackle great theoretical problems requiring working conditions which are still unobtainable. Vietnamese medical researchers in the first place deal with predominantly clinical research work, practical questions which can be solved without expensive equipment, making up for the lack of precision instruments thanks to their dexterity and resourcefulness and striving to adapt

modern techniques to the still modest working conditions in our country.

Because of the permanent state of war during the past quarter century, surgery is a relatively developed branch. A number of surgeons are credited with over 20 years' experience, having worked both in peace time and in the two wars of resistance. They possess fairly advanced knowledge in different fields of surgery and are capable of performing all operations of modern surgery. Some have even made notable contributions to the progress of surgery in both technique and theory, for example in hepatic surgery, with the technique of bloodless and regulated resection of the liver; in lung surgery with the surgical treatment of lung metastases; in the surgical treatment of uterine chorio-epitheliomas; in oto-rhino-laryngology with the technique of resection of the larynx and hypopharynx, the treatment of brain abscesses of otitic origin etc.. Unfortunately, their work is inevitably limited by the lack of adequate equipment, laboratories and other material means. In organ transplanting they still remain in the experimental stage, and are not yet able to perform such operations on humans (transplantation of the liver, heart, etc.). All the other branches of medical activities are in the same situation, which is further aggravated by a hot and damp climate requiring tropicalization of research equipment, mostly imported. Research in biophysics, immunology, genetics, cybernetics, etc., still remains in an embryonic state.

For all these reasons, in the present stage the essential task of Vietnamese researchers is to get informed about the latest achievements of modern science, learn from the experience of other countries and apply it to the conditions of our country. They have to carry out extensive synthesis and adaptation, making a choice among advanced techniques and applying them rationally to local conditions. This is what they have done in the preparation of vaccines (Sabin-Shumakov anti-poliomyelitis vaccine, BCG, etc.), in surgery and other branches of medical science. If they slavishly imitated the developed countries, they could not hope to get any results in the next 10 or 15 years.

3. In Viet Nam, for several thousand years there has existed a national medicine, the fruit of local efforts and cultural exchanges with neighbouring countries. Its history is marked with achievements by eminent physicians, particularly Tue Tinh and Lan Ong, whose written works constitute a precious cultural heritage. This traditional medicine includes many recipes,much precious experience in both treatment and pharmacy, the latter based on local pharmaceutical products. Traditional medicine, still full of vigour, has rendered great services to the Vietnamese people during its long existence.

In former days, modern medicine imported from Western countries ignored the valuable teachings of popular medicine. The general line of the Workers' Party in public health is to study traditional medicine

with methods of contemporary medicine, and, on this basis, realize the fusion of the two into a modern vanguard medicine with a national character. The alliance of contemporary medicine with traditional medicine has proved to be fecund and promising. We have perfected methods of treatment for some affections, such as procident hemorrhoids (cauterization by a special ointment), certain forms of obliterating arteritis, some allergic diseases, etc., and the treatment of various diseases by acupuncture. The treatment of war wounds, burns, fractures, etc., has extensively benefited from popular recipes and the experience of traditional medicine practitioners.

The study of local *materia medica* and an extensive survey were started several years ago, dealing especially with medicinal plants without neglecting substances of mineral or animal origin. The antibiotic virtue of certain plants has been discovered, such as that of *Wedelia calendulacea Less.* (*Sai Dat*), *Lactuca indica L.* or *Sonchus floridanus Lour* (*Bo cong anh*), etc., the anti-allergic properties of *Oroxylon indicum Vent.* (*nuc nac*) and the curative action of many other medicinal plants hitherto little known to physicians of the younger generation. Substances of animal origin such as tiger bone, bear gall, etc., have also been interesting subjects of research in geriatrics and traumatology.

4. The experience of many advanced countries has shown that bio-medical research cannot by itself solve many major public health problems. Despite great

progress in medical research, both the general mortality rate and the infantile mortality rate in those countries have not gone down and have even proved to be irreducible. Many new diseases have appeared. Some pessimism is being felt over the possibility of prolonging the average life expectancy beyond the age of 70.

Man is a social being subjected to the influence of his environment, both when healthy and in case of illness. Many affections cannot be cured or eradicated by medical means alone, such as alcoholic cirrhoses, venereal diseases, certain infections or epidemic diseases. The liquidation of social diseases, particularly those affecting large numbers of people, requires a series of sanitary and social measures other than medical therapeutics.

Medical research in the DRVN, until now hampered in the bio-medical and experimental fields by material and technical difficulties, has paid particular attention to the medico-social sector in order to find solutions to great health problems. It turns to account the advantages of the new social and political regime. Prevention of diseases is the main objective of medical research in the DRVN. As is well known, it cannot be realized without active cooperation from the masses, and vigilant direction by the government. Since the revolution of August 1945, our medical research has sought to solve major problems of individual and collective hygiene in an economically backward country. It has been working for solutions to the faecal problem (double septic tanks for rural areas and suburbs of

large cities, rational ultilization of human manure in agriculture and in vegetable growing, septic tanks with hemi-siphon in industrial areas); to the problem of water for household use (purifying pond water, treating brackish water, digging filter wells in marshy regions, etc.); to the problem of sanitation in urban and rural areas, liquidation of unhygienic ways and customs and their replacement by good habits, etc.

The protection of mothers and children, a constant preoccupation of the government, is a vast subject of study. So are the prevention and eradication of epidemics, social diseases and other diseases affecting large numbers of people (ulcers, parasitoses, etc.). Vaccination against infantile poliomyelitis has been made compulsory since 1960, BCG vaccination is systematically carried out for infants, schoolchildren, adolescents, young conscripts.

Official statistics and reports by the Public Health Ministry bring out the achievements resulting from this orientation given to our medical research (See Table 3). Despite the war imposed on the Vietnamese people by the US imperialists, for many years no smallpox, cholera or plague epidemic has broken out on the territory of the DRVN. Many infectious diseases are receding, or at least have been checked.

Table 3. Statistics on some frequent epidemic diseases.

DISEASES	1964		1968	
	Number of stricken persons out of every 100,000 inhabitants	Mortality rate (in relation to the number of stricken persons)	Number of stricken persons out of every 100,000 inhabitants	Mortality rate
— Infantile poliomyelitis . .	1.6	4.01%	0.07	0%
— Typhoid and paratyphoid fever	12.3	3.65	1.2	1.23
— Diphtheria	5.2	15.2	0.4	14
— Chicken-pox . . .	175	0.03	75.32	0.006
— Measles	333	0.2	309.18	0.2
— Anthrax.	1.21	0	0	0
— Whooping cough.	414.2	0.15	191.62	0.11
— Influenza.	1,319.8	0.02	1,000.79	0.02
— Dysenteric syndromes	296.8	0.17	62.77	0.13
— Diarrhoea.	1,621.4	0.28	354.69	0.2
— Viral hepatitis . .	12.3	0.91	8.43	0.39
— Acute encephalitis	3.6	22.4	2.36	20.88
— Acute meningitis	11.2	18.12	1.96	18.02

The morbidity rate has not increased since 1964 with regard to tuberculosis and other social diseases.

Alcoholic cirrhoses, venereal diseases, etc., are seldom found in North Viet Nam due to the wholesome and temperate life of the population and the cadres.

The general mortality rate in 1967 - 1968 was 7. 6 per thousand and the infantile mortality rate, about 24 per thousand. In Hanoi, the infantile mortality rate in 1968 was about 17 per thousand.

Thus, resolutely oriented towards prophylaxis, our medical research has found the first solutions to many health problems, with necessarily limited means.

Structure of Medical Research

Medical research in the DRVN is organized along the following line:

1. It is taken in hand by the State. In present conditions, medical research being very expensive, the State must provide appropriate investments in cadres, capital and technical material, and create favourable conditions for the workers. The State must coordinate the work of different organs and concentrate efforts on vital and urgent problems. Clear-sighted guidance by the State is thus an essential condition.

2. The efforts of medical workers at large and health organizations must be mobilized for research work.

Besides a core of skilled and well-trained researchers who have mastered vanguard methods and techniques, the participation of the great mass of medical workers at different levels is most valuable. They contribute the experience of their daily practice, especially in problems cencerning the mass of the population. On many occasions, assistant physicians and other modest medical workers have informed professional researchers of the curative virtues of medicinal plants and other *materia medica*, or have discovered the secret of popular recipes, etc. They have enlarged the ranks of the researchers in some sectors, and especially in large-scale surveys.

3. The study of popular medicine requires wide prospecting among the masses for popular recipes, both curative and prophylactic, and for new medicinal plants. This cannot be done without the participation of people of all walks of life, including practitioners of popular medicine. A long and patient propaganda work among the masses is therefore necessary. This work, done for several years now, has yielded initial results embodied in the collection of thousands of recipes and medicinal substances. Thus in a new country like the DRVN, medical research is the result of the collaboration of three elements : trained researchers, rank-and-file medical workers (of both the older and younger generations) and the masses — the trained researchers constituting the core.

Medical research is undertaken by the following organs :

1. Seven specialized institutes :

— Hygiene and Epidemiology Institute.

— Institute of Malariology, Parasitology and Entomology (whose buildings were destroyed by US air raids).

— Tuberculosis Institute.

— Ophthalmology and Trachoma Institute.

— Materia Medica and Drug Control Institute.

— Mothers' and Children's Protection Institute.

— Popular and Traditional Medicine Institute.

The work of these Institutes has been more or less affected by the US war of destruction. The centre for leprosy study — the large Quynh Lap leper hospital — was completely destroyed by US bombing.

State plans for the future provide for the establishment of new institutes, especially in the fields of fundamental sciences.

2. The cadres' training schools, particularly the Medical Colleges and the Colleges of Pharmacy.

3. The hospitals, and epidemiologic stations at different levels.

4. Drug factories.

In the Public Health Ministry, the direction of medical research is in the hands of :

a) The Science and Technique Department, charged with directing and coordinating medical research work

in the whole country, elaborating a plan for the development of medical research, etc.

b) The Science and Technique Committee which serves as a consultative committee to the Ministry, giving advice on all scientific and technical questions in public health (See Table No.4).

Each public health organization (research institute, cadres' training institute, etc.) down to the district level, has a similar Science and Technique Committee acting as a consultative body to the administrative direction of the establishment.

Prospects

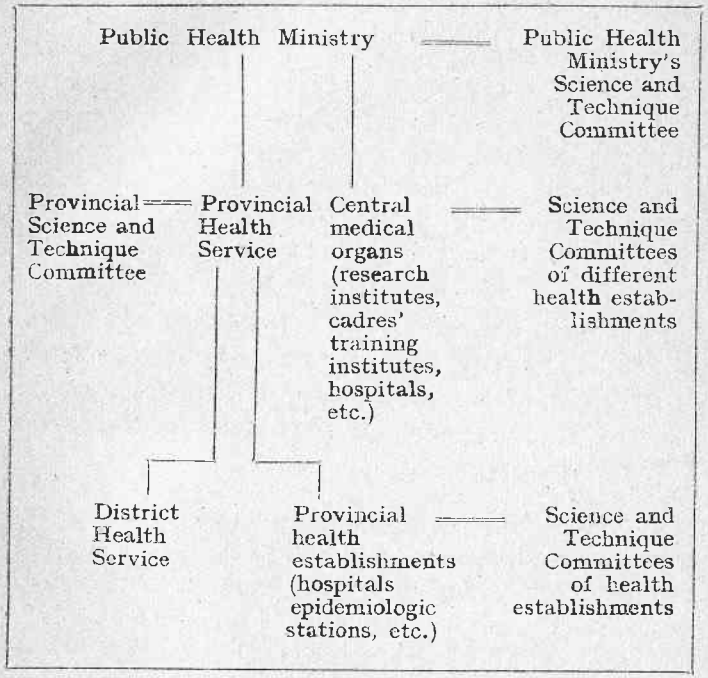
For the 15 years following the restoration of peace in Viet Nam, the Public Health Ministry has elaborated a vast programme of action aimed at :

— liquidating the sequels and complications of war wounds and diseases brought by the war ; and

— preserving and improving the health of the population, especially that of women and children.

This programme of action is included in the general framework of intensive industrialization of the country and comprises the following essential points :

Table 4. Medical Research Organization



1. Liquidate the health sequels of the war:

— Give care to war veterans for the sequels of their wounds and make it possible for the majority of them to return to active social and familial life.

— Prevent and cure diseases caused or aggravated by the war (mental diseases, neuroses and psychoses, hypertensive diseases, etc.).

2. Keep off epidemic diseases still affecting our South-east Asian neighbours(cholera, smallpox, plague, etc.) but

no longer seen in the DRVN for many years. Successively and gradually eliminate other epidemic and infectious diseases (influenza, whooping cough, measles, etc.) which still exist in Viet Nam as in other countries, despite efforts made by the Public Health Service to jugulate them.

3. Continue the programme for liquidating social diseases begun with the first five-year plan (1961-1965) but more or less hampered by US aggression: malaria, tuberculosis, trachoma, leprosy, etc. These diseases, together with venereal diseases, are particularly serious in South Viet Nam where no real effort has ever been made to eradicate them (venereal diseases, of course, can be wiped out only after the total withdrawal of US and satellite troops).

4. Sanitation work and improvement of living and working conditions and of the diet, etc., according to a comprehensive plan of hygiene and prophylaxis, to ensure to the people a wholesome life, conformable to the requirements of modern medical science.

5. Strive to prevent and cure common diseases (ulcers, rheumatism, parasitoses, cardio-vascular diseases, cancer, etc.) and diseases related to the intensive industrialization of the country.

6. Increase the supplies of drugs and equipment to the population and to medical establishments at all levels, by developing the pharmaceutical industry, the extensive growing of medicinal plants with high therapeutic value, the breeding of animals of medical use.

Especial attention must be paid to industrial centres, mountainous regions, and to the protection of mothers and children.

Medical research must assist the Public Health Service in the realization of this vast health programme extending over 15 years after the war. It must work out:

— a long-term research plan for a period of 15 years;

— detailed five-year plans and annual plans.

The first post-war five-year plan will contain these main points:

1. Survey work in various fields (biology, morphology, epidemiology, natural medical resources, various diseases, etc.).

2. Liquidation of the sequels of war wounds.

3. Gradual elimination of principal epidemic and social diseases.

4. Improving individual and social hygiene.

5. Sanitation work and improvement of the living conditions of workers, women and children.

6. A programme for intensifying the preparation of vaccines and drugs of general use.

7. Studying the common diseases affecting the mass of the population.

8. In the light of modern science and modern technique, studying the experience of traditional medicine and pharmacy.

On these different points, concrete subjects and themes will be elaborated in the annual research plans.

The realization of this first five-year plan will lay a firm foundation for future plans, and will therefore have a decisive influence on the long-term medical research plan. Great efforts must be made by the Health Service and the Government to ensure the success of medical research, which requires:

1. Clear-sighted and skilful guidance by leading bodies well informed of the great progress of modern science, deeply aware of our present and future possibilities and having a flexible, non-conformist style of work.

2. The creation of new institutes, of efficient research units and groups, the strengthening of existing institutes with regard to cadres, equipment and other material and technical means, including libraries and information work.

3. Intensified training of cadres for research and daily medical work at different levels, and continuous raising of their cultural and technical standards.

4. The concentration of efforts on advanced sciences and modern techniques.

5. Intensified international collaboration, chiefly with socialist countries and other friendly countries.

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