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 *Peace and Harmony* 





The Journal of
the Royal Institute of Thailand

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Peace and Harmony

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Foreword from the President of the Royal Institute of Thailand

In this second English issue of the Journal of the Royal Institute, I am particularly pleased that there are several papers promoting peace and harmony, of which our country now has great need, in order to ensure its continued survival and progress. Conflicts within the country and with our neighbour have been threatening peace and unity for some time, and if these conflicts cannot be amicably resolved, our country will be weakened. By uniting in our efforts to solve the serious political and economic problems facing the country and the whole world, we may succeed in bringing benefit to all. Practical strategies: academic, social, ethical and spiritual should be mapped out as a guideline. We need progress in every field of knowledge in order to contribute to the welfare of the people all over the world. The Journal of the Royal Institute aims to contribute towards this objective as much as possible.

Panya Borisutdhi

**(Professor Dr. Panya Borisutdhi)
President of the Royal Institute**

Editor's Note

Peace and Harmony is the theme of the Journal of the Royal Institute of Thailand Volume II, 2010. As the present world is facing many conflicts and terrorist activities, we are looking for ways to attain peace and harmony. We cannot leave it to peace activists alone to find the solutions leading to peace and harmony. All of us must join forces to make the world a better place in which to live. The Journal Volume II is the forum.

All religions stress the importance of peace and harmony, yet religions themselves are often the cause of conflict and violence. However, to turn our back on religion is a worse course of action. To see or hear both sides of the story, to reason, to forgive and to seek the middle path or moderation are recommended for all.

If we can get to the root of the conflict which may be racial, political, religious, economic, psychological or moral, we can find the right solution to end the conflict peacefully and avoid violence in any form.

Speaking of peace and non-violence, Mahatma Gandhi's words and deeds come to our mind. Many people have heeded his words and adopted his method of non-violence or Ahimsa very successfully. Nelson Mandela in South Africa, Martin Luther King Jr. in the United States of America, Vaclav Havel in Czechoslovakia (now Czech and Slovakia) can be cited as examples. Yet we must take note that to attain peace, truth and non-violence must join forces. Without truth, that is, if the cause is erroneous, non-violence will be an empty word that will not be achieved, and peace will not be possible. That is why Gandhi calls his method Satyagraha which in Sanskrit means "holding fast to truth"

Non-violence or Ahimsa for Gandhi does not simply mean "not using the violent means." Non-violence, according to Gandhi, also means love, compassion and tolerance. Not using weapons may be easy, but it is very difficult to achieve true non-violence. Gandhi says, "We may never be strong enough to be entirely non-violent, in thought, word and deed. But we must keep non-violence as our goal and make steady progress towards it ... The truth of a few will count. The untruth of millions will vanish even like chaff before a whiff of wind."

This volume offers readers various views concerning peace and harmony. While Mahatma Gandhi offers the use of Satyagraha, this forum is open wide for all ideas and contributions within and outside the theme.

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Pertaining to the Front Cover

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When I hear the word “peace,” I think of a pigeon soaring joyously towards the sky without having to fight or quarrel any longer with fellow birds or other animals. It is all about Peace and Freedom at the same time.

The theme of this issue of the Journal of the Royal Institute of Thailand is “Peace”. Therefore, I began to design the cover for the journal by sketching the picture of “Peace” in my imagination. The preliminary sketch was drawn by pencil on paper. It was a small picture only 8 x 10 cm. in size, depicting a pigeon soaring up to the sky, with the pigeon placed at the upper part of the paper to illustrate the flying motion. The background of the picture was drawn so that the upper part was darker than the lower part to emphasize the wide perspective of the sky and to enhance the pigeon, so that it became more distinctive and buoyant. **(Figure 1)**

The picture of the pigeon according to my imagination still lacked a lot of factual details. It was therefore necessary for me to study real pigeons as well as their photographs and to make sketches of them flying. I needed to observe the way they spread their wings and the characteristics of their legs while soaring up to the sky, including other details such as their feathers and the colors of the feathers. **(Figure 2)**



Figure 1

Preliminary sketch for “Peace”, 8 x 10 cm.



Figure 2

Study of flying pigeons, 23 x 23 cm.

From studying the pigeons and their photographs, I found that none of my study works fitted my specification. So I made a new sketch using those of my study works as my source of data. I chose to draw the pigeon at 45 degrees diagonally and made the wings spread to a certain width in a soaring position. If the spread of the wings was too wide it would result in a picture of a pigeon gliding in the sky, which was not my concept in painting the picture. Significantly, I cut out some unnecessary factual details and made the lines sweet and flowing like those of Thai paintings, making the pigeon more idealistic. **(Figure 3)**

When I obtained the sketch I desired, I used watercolor and color pencil to paint a 27 x 32 cm. painting on paper, starting with painting the whole area in blue first to show the vast sky, leaving a white space for the body of the pigeon. Then I used color pencil to draw over every part of the picture to emphasize the atmosphere and harmony within the picture. This served to suggest that the radiant white pigeon was soaring up to the sky with a happy frame of mind, with no need to fight or quarrel with fellow birds or other animals any longer, rendering a feeling of peace and freedom at the same time. **(Figure 4)**

The picture of a radiant white pigeon soaring up to the sky with a joyous mind contains soft and sweet flowing lines in the style of Thai painting. It is the picture of an ideal pigeon that conveys the concept of “Peace.”

Nevertheless, “Peace” is not an idealistic concept or belongs to any one nation. All of us can turn this idea into reality if we only cooperate to make it happen.



Figure 3

Sketch of flying pigeons for “Peace,”
12 x 12 cm.

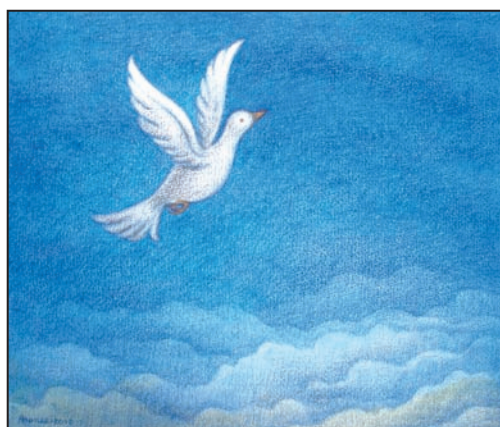


Figure 4

“Peace”, 2010. Watercolor and color pencil
on paper, 27 x 32 cm.



Towards A Culture of Peace in Thai Society

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Abstract

Worldwide experience shows that arriving at or maintaining a culture of peace and non-violence is a major problem that affects a great many societies. A few non-violence and civil disobedience movements have been successful in this in spite of the odds stacked against their success. However, strife, violence and many conflicts or wars persist across or within countries. These adversely affect and even endanger, the lives of people at many levels, ranging from the individual and family to the community or country. Hence its causes need to be recognized and its emergence observed closely so as to address any shortcomings (preferably, by non-violent means) and thereby pre-empting, reducing or resolving conflict.

At the most basic level and the best place for observing, simply measuring and reviewing the absence of *abuse* and *violence* between individuals would naturally be within the family. This primary social institution and indispensable pillar of society provides socialization to its younger generations and thus passes on the most crucial social values. On this positive social mores must be encouraged in schools so that a sense of communal solidarity and social cohesion is nurtured within society. In its absence a state of *non-violence* and *peace* at the level of society at large cannot be reached or maintained.

Responding to conflict in the South or the political confrontation or indeed restoring *Peace* and *Non-violence* in Thai society, will be elusive unless the family, the workplace, and the communities, have all maintained or have a will to reclaim such a state of peace. To achieve this objective the present social divide with political division and social strife pervading society must be addressed. In this context, attention needs also to be paid to associated symptoms such as deficits in lack of civility, respect, cohesion and social solidarity amongst its diverse components. Unless these are addressed wisely yet decisively, and hence this challenge turned into an opportunity, Thai society at large will be hard pressed to (re)gain its stride.



Preconditions of and requirements for achieving and maintaining a violence-free society and thus lasting peace in Thailand are many. Solid foundations with the individual and the most crucial social groups must be laid first. This requires some adjustment and fine-tuning to socialization and curricula offered in school. Special efforts to enhance dialogue across social groups and communal bonding need to be undertaken, then, in tune with a communal spirit, social cohesion and solidarity will grow as will a *culture of peace*.

Key words: Non-violence, peace, violence, conflict, conflict resolution, Gandhi, King, civil disobedience, Thailand social problems, community action, national dialogue

Introduction

Non-violence Movements

When we speak of non-violence and peace we tend to think of the visionary concepts, the model movements led by Mahatma Gandhi and Martin Luther King, that pursued a non-violent approach in their civil disobedience campaigns. So far, the official Thai response to the challenge posed by the unrest in the South has primarily been a military one or some other form of containment, coercion or enforcement. Would other approaches - without following the immediate reflex of resorting to force - have been feasible, at all, given the circumstances and the actors involved?

Interestingly, major civil disobedience, autonomy or independence campaigns have been waged successfully without resorting to, or even purposely banning, violence and also with essentially the other side, those in power, by and large have refrained from using (undue) force, on their part, too. Both, Gandhi and King – leaders of the most well known such movements in recent history - had studied the respective situation and power structure in much detail and for many years, assessed their own strengths and weaknesses and of their followers. They also discussed their grievances and conclusions as well as actions planned.

Their non-violent movements set historical precedents for waging emancipation campaigns against the powers-that-be without resorting to violence. In that they needed to depend heavily on the other side's understanding of their motives and (to some degree) the appreciation of their tactics, so that these would play according to certain rules and avoid state violence wherever possible. Otherwise their various marches and other actions challenging the authorities could have ended in much



bloodshed. Essential also in their eventual success was that their own side did not overreach and that they relied on the fact that the state did not over-react either.

Conditions for a Culture of Peace

The road to non-violence and peace is arduous, even uphill, and one must strike all that engages in this topic. *Conflict* and *war* are rife in our modern world; in all too many countries and continents *violence* and *terrorism* persist. The fact that promotion of peace and non-violence is not a simple task is probably best illustrated by the fact that the much invoked *Culture of Peace* at the focus of the UNESCO's *International Decade for the Culture of Peace* propagated at the global scale was in fact witness to many a major conflict. Of those several persisted until well into the Decade's final year (2010) and though the *World March for Peace and Non-violence* reached its destination early in 2010, it did not accomplish its goals, not by a far cry. Neither did it achieve its lofty targets hoped for during the *International Decade for a Culture of Peace and Non-violence for the Children of the World* (2001 to 2010).

We must then contemplate limitations of such a global approach and accept: non-violence and peace actually must start at much less grandiose dimensions and take off from a more modest level, at home, with the individual and their respective families. These must be provided with clear values and virtues as well as with suitable 'tools' capable of fostering communication, cooperation and compromise to develop on their own a spirit of consensus and solidarity with their fellow man and citizen. Only on such a firm foundation can non-violence and peace eventually thrive in the entire country. On such a firm basis could we then dare thinking about building a non-violent and peaceful world?

Whilst reviewing the Thai world view and family values and gauging its relative strengths and weaknesses, its resilience in the face of the new challenges that lie ahead, we ought to observe how Thai individuals socialize and how they mature, in addition to examining the formation of their specific personalities. Additionally, in the midst of a rapid transformation, pertinent recent socio-economic and cultural changes, and their impact on Thai individuals (and society) need to be assessed as well. A great many such challenges, overwhelming influences and vital catalysts generate and/or affect such change.

To arrive at a culture of peace and non-violence, however, loyalty to their community and solidarity with others on the part of individuals must not be limited to family members or include just a few close friends and associates. For communal spirit to thrive, the vast majority needs to be included in order that society enjoy



equilibrium and harmony. A fair, equitable and a modern participatory society, develops only where the needs and expectations of the individual and that of society at large are balanced. To this end, the roles of all parts of the social chain (individual-family-group-community-nation) need to be strengthened. In particular, the link between family and social units above all must be augmented and thus the latter strengthened.

Thailand's Unexpected Conflicts

This may not come easily to a society characterized by uneven relations, where someone is always higher, the other lower, someone senior, the other junior. Under such conditions a society of equals hardly can emerge, rather one of patrons and clients, of leaders and followers, of those who control and those that are controlled. Distrust and discontent is likely, pent-up frustration and anger on part of those less or not at all entitled can be bottled up too long and in the absence of a security valve can erupt amidst much fury.

Despite – or because of – these inequalities Thais were not ‘familiar’ with strife or open conflict, neither in their private nor in public lives. Only recently has this begun to change, though: now dissent and unrest seem to be ubiquitous as illustrated by constant public bickering, pervasive distrust and suspicion. Continuous attack and counter-attack have become commonplace fueled by mutual reproach and recrimination at the level of politics, even unrest and open conflict has broken out in the South.

While its neighbours suffered major internal unrest, even civil wars, Thailand did not face domestic problems of such scale nor open strife for many decades. However, quite ironically, just as the turmoil in those countries seems to be abating, within the past five years civil strife has erupted in the country's South. Moreover, at the same time, broad economic disparity and sharp political divisions between Bangkok (and other urban centres) and the rural provinces with a host of multi-faceted adverse consequences have now surfaced and become all too visible.

Thailand then needs to search for and arrive at a distinctively Buddhist solution that can help to resolve the current quagmire. However the towering role and mitigating influence of Buddhism *per se* is under an onslaught of ‘modernity’ and ‘urbanization’ and its ‘out of the world’ doctrine collides with the ‘within this world’ message of other religions and, specifically, of Western culture. This culture's perennial propagation of and relentless drive towards economic progress at any cost (with its core message warmly embraced by a significant part of the young generation) has brought about



rampant consumerism, drug and a host of other social problems and these vices must be overcome. Thus a host of such contradictory viewpoints, tendencies and messages now symbolize the real-life division in Thai politics and society.

Past

Thai Family

Thais traditionally lived in small sedentary agrarian communities, where peaceful coexistence without major disagreements have long been the norm. In this largely static society organized around extended families with its younger members (or those lower in the village hierarchy) performing their assigned chores and without question or without questioning their elders. They were socialized early in infancy towards deference to their elders and learning to *wai* properly. When in school their teachers and textbooks transmitted similar values and perspectives and pointed them towards comparable attitudes. They were constantly admonished for not showing respect or expressing gratitude, for losing patience or sight of the fact that in society there were powers greater than them and their own humble and limited position. Trained to excess in forever withholding their own opinion and forgetting their pride, probably has caused frustration and anxiety to individuals, on the other hand prevented violence, friction or open conflict within communities.

Socialization and school curricula follow(ed) conservative norms and values as well as employing traditional forms in its transmission. What is taught is to give in to those older/senior and not to question their teachings, ideas, orders or to adopt a critical attitude or express skepticism of any kind. The schools reiterate and confirm such views and, by so doing, reinforce the traditional hierarchy of things and people. Hence, neither family nor school are preparing children and students for work in a modern workplace nor, for that matter, for life in a modern society where people are expected to freely express their views and discuss their diverging opinions with others in an open and pragmatic manner, without being either overly deferential or aggressive.

Individual and Society

Thai socialization, it can be concluded, does not successfully prepare people for an open exchange of opinions, nor in the field of human interaction nor does it teach how to deal with expressing or responding to grievances, objections or dissent. Discussion and argumentation are suppressed in favor of agreement and conformity.



Discussions over debatable issues are not won or decided by ‘better’ arguments but by the relative position of those involved. Quite likely though this is leaving those on the ‘losing’ side at times with a deep unresolved frustration.

This also explains, why – when it comes to public or political issues – Thais commonly prefer to remain ‘invisible’ and are not inclined to speak their mind in public in case they risk exposure or invite criticism or ridicule. Elevating this argument to the level of the wider society; such characteristics and traits are conducive to maintaining the status quo and support the ‘powers-that-be’ in exerting and maintaining control over their subjects. Are these then a positive force or influence or a drawback to modern urban life?

The dramatic and fast-paced transformation of society – as witnessed over the last five decades – that have released many millions of people into a chaotic urban environment, with its smaller families and relatively uncontrolled, individualized, living and life style have changed the status quo and upped the ante. The family cannot control its individual members at ease any longer as in times past. As it turned out, even the schools’ authority over adolescents cannot compete with peer pressure; today’s youngsters at times seem more open to influence of modern pop culture and the media than to traditional values.

Limited Public Concern

While Thais as individuals are not really prepared for open communication or for trusting or relying on the world outside of their family, social institutions that would be inviting or supportive for such attempts are not readily available either. This is another shortcoming of Thai social structure; social institutions at the intermediate levels are either absent or fragile, hence not dependable. The transmission of trust and good will, the ‘glue’ of social cohesion, from family to some higher social entity needs improving. The links between family and community (and again between community and the nation) must be viewed as fragmented. This is so because of an underlying apprehension towards ‘outsiders’ and open distrust towards ‘strangers’ and thus not much inclination towards including all and sundry within the ‘in’-group.

A simple test for the lack of communal orientation or space would consist in walking through the streets of our towns or cities. Whether a building or its location or positioning (or that of a street or an entire neighbourhood) is pleasing to the eye is of less concern; its main purpose is to make money (or simply showing off). The obvious lack of city planning and urban design that resulted in a stark deficit in public spaces or parks for esthetic reasons or the recreation of their residents



constitutes a major draw back of Thai cities. Both these deficiencies are interconnected, because when few look out for the common good there is little space left or reserved for the meeting of peoples – other than for sleeping, moving about or working. People sleep, commute or work; they do not meet out in the open.

Present

Uneven Relations

Given these values and traditions the country appears not particularly well prepared for modern dialogue or equipped for open discourse between society's major stakeholders, such a dialogue commonly requires two sides standing on an even keel. Where one clearly holds the dominating position and so is provided with far greater resources and power and thus may (attempt to) order or dictate at will, there is no need or reason for entering into conversation that could eventually lead to compromise and thus, probably, loss of face.

This is very much the case in Thailand where authorities traditionally hold the upper hand – by default. These can thus choose to act at will, even in paternalistic and authoritative ways, rule over, and apply pressure, use force or coercion in their dealings with the public at large. More such lopsided relations exist within the institutions of law enforcement and the armed forces too, even with the academic sector. The private sector mirrors such uneven power relations – probably taking even a lead – with employers having the upper hand and at times demonstrating this air of superiority, while employees, workers and unions in general are unable to withstand this pressure and, overall, have proven powerless.

Invariably, some one is higher or lower, in control or controlled and from the very outset all find their place within a strong hierarchy. Opinions – especially if diverging from the accepted 'norm' or prescribed values - must be kept within and not expressed. Hence, society lacks an apt security valve for letting off pressure as well as offering opportunities for informal and non-offensive discourse between proponents of diverging views. Its presence could have led to reducing confrontation and thus preventing open conflict. Instruments for reducing or resolving public strife by peaceful means, such as a 'Peace and Reconciliation Commission' are not in place.

A characteristic of traditional Thai culture – as in quite a few other Asian countries - is the subordination of an individual under the head of the family as well as under a comprehensive system of seniority which is enforced by the ever-present fear of losing face and thus dignity. It is an effective but not overt form of social control which does present itself in this way and hence does not need any 'sanctions' to maintain its existence.



Evading Reality

Thai individuals are constantly discouraged from probing into relevant yet potentially divisive issues; rather they are admonished to remain at the surface of things - out of politeness, fear of losing face, apathy or denial. This amounts to some form of evasion of reality. Denial of reality or of unwelcome news is quasi institutionalized via the over-riding fear of losing face and dignity or of being a harbinger of unwelcome tides. One is not supposed to concern oneself much with others and their affairs. This reluctance results in another weakness, though namely the inability of slipping on the shoes of others – seeing things from their perspective. This again leads to misjudging reality and to erroneous ideas as to how the other side will feel and react to one's own actions – potentially disastrous when fault lines have already surfaced and fatal when violent conflict has already erupted.

Moreover, in line with the above, a distinct built-in hypocrisy immanent in Thai society is undeniable, such as when Thai youngsters from 'good families' behave at home in a traditional subdued tone and with submissive manners, however once away from prying eyes and out of parental control and amidst their friends don revealing outfits; some even display morally questionable behavior in public.

Into this pattern of closing one's eyes of denying the facts directly supports the preference for 'face over fact'. Keeping in line with the attempt to present a violence- and conflict- free face of society social problems and vices are commonly not discussed openly. This does not mean, though, these are not present. Swept under the surface these nevertheless exist and persist throughout society: drugs and gambling of many a kind, prostitution in its various guises, even sex selling housewives and students, and various associated contagious diseases. There is further considerable hidden abuse and domestic violence within family and in society as well as business (such as towards migrants, workers and domestic servants) and a host of vulnerable single-mother households.

Avoiding Confrontation

Consistent with the predominance of style and form over content and substance, political discussions (at a level beyond blaming the other side or slinging verbal abuse aimed at their adversaries) are not the usual or preferred modes of expressing political opinion. (Verbal) Arguments are often substituted with rather simple codes and signs employed by the opposing sides to express aggression via 'color'. Other examples of style being preferred to function, or form taking precedence over substance, are demeaning posters or caricatures, burning in effigy of some



despised adversary and the like, instead of entering a debate using mature arguments.

Such reluctance to offend can prevent even the mere mentioning of felt needs or demands or of the airing of substantive grievances and thus precludes nipping conflict in the bud. Refusal of dialogue on grounds that the other side does not ‘know’ things does not help, either. All this is likely to contribute, though, to a growing sense on part of those less educated and powerless that the authorities have not only taken them for granted but have also marginalized and excluded them from mainstream concerns and pleasures. Though helpless as individuals, a multitude of such people motivated with common grievances and assembled in favor of some cause or interest group can be pushed towards a common goal and prompted to joint action; and consequently can accomplish something. Denial of existence of such problems, and thus avoiding open confrontation at this point, and failure of the established institutions and channels to addressing those - while still relatively confined and manageable – contributes greatly to the escalation of dissent and conflict.

Divisions in Society

Thai society is diverse; according to socio-economic criteria highly stratified and divided and not entirely inclusive, with people in rural areas and at the periphery not fully integrated into the economy or society at large. Great differences as to wealth and education prevail. Major economic and social divisions exist, as well as a wide disparity reflecting the rural-urban residence divide and other relevant socio-economic parameters (education, health, life expectancy, income and property). This means, Thais hailing from such diverse backgrounds must be talking at cross purposes because they do not share many traits or assets, preferences, likes and dislikes – with people outside their own group of reference. On the one extreme the semi-literate rural low-income earners and the highly educated urban high-income earners positioned at the other end have nothing in common.

With social distance, economic gaps and other divisions in society still growing, those lagging behind on certain social indicators, including their incomes which may be precarious, may entertain a growing sense of being disenfranchised and excluded from the mainstream of having a quality of life. Similar convictions will grow even more when they feel that they are not receiving respect from those more powerful or affluent. With their emotions bottled up and their aspirations disappointed, their frustrations not relieved, a potentially worrying combustion is thus set on course.

The stark division in and stratification of Thai society poses a major



constraint to maintaining or restoring non-violence and peace. It does provide the ground for and contributes a great deal to creating situations which are already full of conflict or have the potential for conflict. Additionally, where confrontation and strife are rife and constant the situation will become entrenched and long lasting. Their diverse life experiences and life styles compound a situation of dissatisfaction and major discontent that could be precursors of protests, strikes or unrest of many kinds. These root causes of division in Thai society are unlikely to vanish in the foreseeable future.

Conflict and Its Lessons

It should by now be self-evident that such historical precedents of civil disobedience and other politically motivated non-violence movements as well as of open conflicts need to be studied, to enable a better understanding of motives, triggers, rules or consequences of non-violent versus violent action, and conditions for avoiding open conflict. Important, too, once started what could probably help extinguish a fire and what tends to fan or reignite the flames? Studying points of friction with the potential for escalation into open conflict, as demonstrated with many foreign conflicts, could help formulate realistic responses to the Thai domestic challenge. Amongst the first lessons to heed is that violence comes in various guises and its parameters and depth are wide ranging.

Violence, peaking in violent crime and murder, may be committed by an individual or else by a group of people, even in their millions for example rebellion or revolution. For a state to enjoy and remain in peace, the latter is more relevant, however we ought to study the similarities and links between such actions by one person and that of groups of people as well. Is there a link between the individual's act of violence and that of a multitude in society? This question needs be addressed. Finding answers to such queries could be relevant for predicting and/or preventing an outbreak of mass violence.

Violence, even that on mass scale, is harder to prevent if less of its common ingredients and factors are known or understood; also, the typical course of such action needs to be studied systematically. Failing to analyse its causes and tendencies and thus the steps towards emergence and escalation of violence will not be fully understood. What does appear to prepare the ground for (mass) violence and what could have prevented it? Steps in the escalation include conditions on the ground and relations between the opposing sides, with fault lines emerging on the surface,



specific events, triggers that lead to reactions on the part of the weaker side and, eventually, to open conflict.

Specific root causes and triggers of violence and conflict may be many, such as rifts between or unfairness felt by members of ethnic, religious, political, economic or social groups or a combination of some or all of these factors. Pressure on ethnic or religious minorities, disparity and discontent between rural and urban dwellers, distrust between the capital and the provinces have been found amongst the most reliable predictors of the outbreak of confrontation or unrest. Into this plays also a wide discrepancy of life styles, whereas a majority still upholds the traditional values, occupations and the 'past' way of life, a growing minority have moved on to more 'modern' choices and outlook. Friction prevails.

An important yardstick for gauging the likelihood of an eruption of violence provides the concept of direct and structural violence, the latter defined as the systematic way in which a state can deter, prevent or exclude individuals from achieving their full potential. Institutionalized racism or gender inequality come to mind as well as the relegation of groups of people to second-class citizenship. Social relations in such societies tend to be uneven (and often static), with some on the top and others at the bottom of the hierarchy. With such conditions, violence does not need to be direct, as it is built into the structure of society and set against those not part of the establishment.

Warning Signals

Indicators and warning signals of potential or impending conflict are many and varied such as in states with a centralised system of administration; a growing dissonance between state ideology (and actors) and self-concept, as well as the aspirations of people in the provinces and/or those on the periphery. When ethnic origin, culture and/or religion of a minority group differs from that of the majority and they feel that they are being pushed constantly towards giving up their culture and mother tongue, a further step towards confrontation takes place. A general air of intolerance or discrimination may persuade those outside of the establishment that their concerns are only marginal. When their communities are not provided a similar level of public services (roads, electricity, water, sanitation) or a say in local matters, or there is a sense of receiving less than a 'fair' share in educational and medical services and little or no economic incentives and development commensurate with that at the national level coming their way, either, disappointment may turn to frustration.



Parameters of Conflict

Parameters and patterns of causes for and conduct of conflict: The greater the physical, objective or emotional distance; the more uneven the power relationship, the more divisive the factors, such as race/ethnic origin and religion and, specifically, a combination of both, or the greater the linguistic, educational or income disparities between the potential opponents, the greater the divide will be and the greater the likelihood of an outbreak of conflict will be. The end result will also result in the greater difficulty in resolving a conflict. All this seems yet more pronounced when these additional conditions are present; the more distant from the country's centre, the closer to an international border, the longer the history of antagonism prevailing or violence and/or the more intense the extraction of natural resources from the territory of the weaker side. Moreover, the less responsive to local complaints and protestations, the harsher the response on the part of the authorities and the more unprovoked coercion and use of (undue) force, as well as the more superior and better armed its forces are directly leads to the escalation of the cycle of violence, revenge and vengeance. Classic cases of this scenario are Sri Lanka and Northern Ireland; the more the conflict tended to escalate the longer it would keep running.

Thailand then with its freshly escalating domestic confrontation and strife by no means stands alone; a great many conflicts erupted all over the world in the midst of a general upsurge in ethnic and religious-based strife and conflict since the end of the Cold War, such as in Southern Europe. In Asia these tended to involve Muslim minorities opposing their respective central governments, Russia is another example (Chechnya and Caucasus) as is China. These conflicts tended to drag on unresolved in spite of major crack-downs.

Limited Reaction

Once conflict in the South was out in the open, the Thai system of governance and administration which is not designed for reacting in a timely fashion when this means compromise, has proven rather inept in extinguishing the fire while still at low flame. Hence, the recent flashpoint in the South and potential other friction points, i.e. the hill tribes and the urban slum dwellers, or rural peoples with their various grievances and complaints, seem beyond the scope of routine governance or traditional responses. Also, those in authority appear not to have regained the initiative in the South but are merely responding and reacting to moves from the other side.



As it has turned out, Thai official responses to the conflict, other than the use of force, appear hesitant and not readily forthcoming, as if the challenge was entirely unexpected and the authorities taken by surprise. In reality the authorities over the years could not even identify and localize its leadership. However historic precedence as well as a host of distinctions including a wide discrepancy between local and mainstream norms and values differing from that of their mainstream neighbours could imply that these contrasting ways of life remain on a collision course.

The developments in the last years have shown that Thailand basically had no operative conflict prevention or avoidance strategy and has a history of missing minority views and not giving in to dissent from outside the establishment. Presently, nearly a decade into the conflict, Thailand still has no coherent strategy and has not developed a dependable facility for recognizing and issuing an early warning in response to these or other groups or points of major friction or to sound alarm bells about impending grave social problems or of an imminent for recognising conflict brewing.

Prospects

Positive Approach

The demonstrated disquieting lack of preparedness to take on such a major issue as the Southern conflict, which at the time of its outbreak had simmered for a few decades and that could not have escaped the notice of the authorities, and which is now still raging in its sixth year. In addition, the public debate about the responses hitherto chosen for dealing with such a major challenge have been proven as “too little, too late” are obviously incapable of containing the conflict.

Lacking the ability or of the means for detecting or interpreting the codes or signals for impending confrontation or of upcoming strife that could warn authorities and the public, or else, reveal the fuses that could go off and thus forestall a major ‘explosion’, we need therefore to examine other conflicts and analyse their typical structure and flow. Often violence is visible at the surface but is found to be just the tip of an iceberg. Therefore, recognizing and addressing friction early could be a major bonus and part of an effective proactive response.

A pre-condition for or reconstitution of internal ‘peace’ is not only the absence of open conflict, a negative/passive goal, but even more so, a confluence of positive interests and feelings towards others, a sense of mutual responsibility and a readiness to collaborate. Reaching a positive synergy requires an input and effort from all sides and need to be based on enhancing common interests and faith in the



institutions. Its' fruition should be achieved by encouraging a basic trust in the system on hand which is a positive/active goal. This would go a long way towards providing a feeling of security, at the communal level, and giving a sense of having a stake in society, thus helping infuse a sense of social cohesion, in lieu of the compartmentalized sense of loyalty and compassion limited to a confined circle, which currently prevails with many in Thai society.

Those who feel that they have a fair stake in the current environment and who appreciate life under the status quo, are more likely to resist the temptation to reject it and opt instead to defending the current way of life. People generally satisfied with their present circumstances, as well as that of the wider society commonly do not make rebels. Instead, these people can afford to enter a debate on issues in quite a relaxed frame of mind rather than being embittered or full of hatred. However currently in Thailand, such civilized debate without bias and political discourse and without prejudice seems in short supply, while short-tempered agitation and confrontation rule the day.

Towards Non-Violence

Violence erupts and conflict breaks out, not peace. This latter tends to be the culmination of a long process strewn with many difficulties and full of diversions. Without non-violence prevailing, though, there is no peace in society. Non-violence needs to be practised, a must for solidarity and cohesion.

Thai society, as indeed any other, needs non-violence and peace to thrive. But what does this mantra really suggest? Is *non-violence* merely the absence of violence and is *peace* just the opposite of conflict or war? Rather abstract concepts, depicting a passive state of affairs without grades or levels of intensity, or should certain positive qualities be associated with these concepts that need to be present for generating or maintaining the wished-for positive state of affairs? These could as well include, enhancing the quality of life and promoting participation in the field of the wider public in the affairs of their communities and nation, as well as instilling positive values, an awareness of the need for social cohesion and solidarity amongst all citizens irrespective of their gender, age, ethnicity, religion, residence, occupation and income.

What does society-wide non-violence – *peace* - really imply? Suppose, 98% would never resort to physical abuse, does this amount to a satisfactory state of non-violence and peace within society? However this would leave one million on the outside of this equation, perhaps too many. Must then not *all* abstain from violence



for that goal to be accomplished? This points towards the need for motivating all its citizens to engage in realizing the vision of non-violence and thus work for peace. Or, at the very least, these need to give their tacit consent and assurance to desisting from acting as ‘spoilers’. Inclusion and integration, non-violence and peace are dependent upon a positive sentiment towards fusing a society with its values and goals as its guiding factors.

Building Trust

In order to reach the active participation of a majority amongst the (local) people, a consensus, in a conflict-prone area and where trust needs to be built (or rebuilt) and suspicion, distrust or hatred diminished, the circle of vengeance and revenge be ended. Trust, like faith, is a matter of (personal) perception and so is distrust and suspicion. Trust is then a consequence of a policy of respect, tolerance, solidarity and consensus. Commonly, those on the other side of power and authority experience the more negative setbacks or sentiments. To restore their belief and trust into the system requires special efforts.

To building trust amongst all or the majority of stakeholders is usually a tedious endeavour and a long term prospect. It needs constant and coordinated efforts of a great many, but can be destroyed in an instant by misdeeds or violence on the part of the deliberate actions of just a few or even by pure accident. Once trust as an institution is broken or faith is shattered, its restoration requires major efforts and much patience. Lessons from multicultural societies with a history of past conflicts, usually involves the restoration of a state of non-violence and this tends to be a lengthy process that requires patience and perseverance on the part of all the sides involved. It does not come easily nor can it be maintained on the ‘cheap’; instead, constant vigilance and active engagement on the side of the major stakeholders are required.

Universally accepted instruments against which progress or otherwise, can be measured are as follows: Many of the most vital ingredients for avoiding friction and conflict as well as for building trust and reaching non-violence are contained in the 1948 Universal Declaration of Human Rights which Thailand endorsed as one of the first UN member states. The Act encourages the inclusion as well as improving the quality of life for the majority by asserting that the “recognition of human dignity of all people is the foundation of justice and peace in the world.” It proclaims four freedoms; freedom of speech, belief, freedom from want, and freedom from fear – which are “proclaimed as the highest aspiration” of the people. It underlines also



“faith in fundamental human rights and dignity and worth of the human person”. Safety and security of the individual, gender equality and other such ideas and legal incitements contribute to inclusion and integration of all people. Where these are present and respected, building of or maintaining trust between the members of society should not prove too difficult.

Sharing Authority

One way of achieving trust and harmony for its citizens as a sense of having a stake in society, is by setting up formal political institutions, at levels below that of central Government, with a share in authority, power and, with fiscal autonomy to some degree. These would enhance political inclusion and promote local participatory democracy. The Constitution of B.E. 2540 envisaged people’s participation and consultation along the process of administration by assigning responsibility to a lower level of Government by undertaking decentralization and devolution of power. Establishing a lower level of political representation and thus enhancing local ownership such as Tambon Councils was a step in this direction. Decentralizing education and the police force administration were also considered.

Another such attempt, at the national level, was the establishment of Independent Agencies provided for and set up under the Constitution. Still, these were primarily ‘top-top’ instruments for advising and checking on those in power. Their implementation was devised on the back of past negative experiences, such as corruption and lack of up-to-date expertise on the part of those with authority. These thus were products viewed with suspicion by ‘the’ people fearing those who govern may not reflect their concerns and therefore may need to be controlled. (An additional draw back is that these agencies, too, comprise of a few selected members who, again, represent the masses.)

Raising Awareness

Whereas violence and conflict tend to proceed with an accelerating pace, reconciliation and resolution of conflict must be viewed as a protracted and gradual process that starts off rather slowly, but not due to a single event. In the absence of security valves, political opponents need first to be equipped with useful formulae for non-confrontational expression of opinion and low-key dialogue. All this could contribute to pre-empting or keeping conflict at low-level. At the same time, it would also afford law enforcing authorities the time for conducting appropriate training for policing demonstrators or for crowd control, by employing a non-violent



approach.

Those in charge, as well as their potential opponents, need to be provided a functional yet manageable conflict avoidance or reduction strategy, not just taught ‘proper behavior’. The rationale and ‘etiquette’ for demonstrating and protesting needs to be taught and inculcated into society too. At the same time, this would also serve to keeping antagonists apart. However, for improving the actual situation on the ground, it would be quite useful to offer the opportunity (on specified occasions) and space for meetings in the public arena and communal spaces as a base to encourage people to join together, rather than living apart.

Overcoming Constraints

Strong evidence gained from the reduction or resolution of former conflicts suggests that even major barriers can be broken down and constraints or weaknesses can be overcome as long as norms and values or social sanctions become flexible enough to accommodate reasonable aspirations and demands. They also need to amend severe shortcomings or soft spots as well as close ‘short circuits’ in order to lodge appeals or demands. There is a need to augment the lack of an interface between authorities and the rest of the people. Even an entirely adverse situation can be turned around, but constraints are abundant:

Adopting suitable and timely responses is key to success. Efforts that have developed useful typologies, dynamics, formulas and models and strategies, have demonstrated, once violence has broken out, conflicts should be taken on in a comprehensive manner, in a systematic and structured approach, not in some isolated or sporadic, spontaneous or improvising way.

Thai society is used to a top-down flow of decisions (vertical bias) and (selective) information trickling down from the authorities to their ‘subjects’ which could benefit from appreciating and even promoting horizontal flows of information, communication and interaction amongst a multitude of actors meeting on a more even keel. For this to take effect, extensive concerns with those in positions of authority need to be overcome, namely, opening up to the public, whether it is a consultation with the public or an enhanced transparency which would water down their control or endanger their authority.

The authorities need to adopt the art of compromise. In the past the authorities aim to restore the status quo was the ultimate goal, for those on the other side the aim was total change, so as to reverse their fortunes, fulfill all their aspirations and thus present them with a positive future. Compromises ought to be found



through negotiations and mediations, as arranged by a neutral partner rather than to look for solutions solely with the opposing sides.

So far, Thais have found it difficult to ‘insulate’ grievances so as not to go overboard, neither with demands nor reactions. From never complaining, the pendulum has swung to the other extreme, it has become fashionable to be complaining all the time about all and sundry and demand a total turn-around of society and the reversal of the status quo. Those concerned must learn to identify what is important and what is less so, to separate the essential the ‘core’, from the peripheral, the ‘negligible’.

Enhancing Communal Spirit

Typically, once centralized administrations encounter local problems or are faced with protests, high-ranking officials deciding on measures to be taken (or not) or some other high-level panel which will discuss matters. This kind of reaction leaves out two crucial levels, that of the individual (affected) and that of the community (concerned). They need, however, to be included in any such efforts, to address and remove conditions for disaffection, violence and conflict. Crucially, such efforts thus need to be taken up on two fronts, at the level of the individual and a second intermediate level of the social institution and of groups. Hence, issues of concern [and soft spots] within Thai society that have surfaced in issues related to these important aspects need to be addressed and the social institutions at both these essential levels targeted.

Besides, at a more general level, to generate a sense of solidarity, individuals need to extend basic skills on how to exchange views and opinions. Moreover, a sense of belonging to something greater than the family needs to be generated or encouraged, which will help foster a sense of communal rights and responsibilities. In a way, components and mechanisms of a social as well as inter-generational, and rural-urban dialogue need to be developed. However passing on any non-traditional ideas and values tends to be an uphill task once a person has turned into an adult, complete with a fixed set of values, world views and ideas that impose a standard set of attitudes and fixed patterns of behavior. Hence, children and youth need to be a prime focus of attempts at creating awareness and or affecting change.

One set of long-term responses then ought to target adapting principles, substance matters and messages of socialization and formal education, i.e. parenting/ socialization and school curricula and syllabi, to the requirements of a more open, inclusive, tolerant society, while another, more short-term reaction could be targeted,



directly at reverting and reducing friction or conflict via media, government officials and core multipliers.

Traditionally, the local population has not been granted a say in matters of local administration ('withholding'). This position could be sustained over a great stretch of time via supportive policies, as well as ideology and or a controlling force. This also meant to keep the lid on emancipation attempts and probably has resulted in 'withdrawing' on the part of those thus sidelined. However, it could be an altogether different proposition when taking back some form of 'freedom' rights or 'independence' once granted. Such set-backs would more likely antagonize, even incense, those who had believed they had been 'set free', accorded some degree of personal 'freedom'. They could be even more offended when observing double standards at play and would probably come to realize their disadvantage.

Embracing Diversity

In our modern world with its streams of migrants and large-scale immigration few states are homogeneous. Practically all Asian countries are home to ethnic and or religious minorities, so is Thailand. Thai society has now arrived at a crucial juncture and needs to come to terms with the fact that up to ten per cent of its citizens are neither ethnic Thai nor Buddhist. Not all of those may share all the world views, values and positions of the majority population which could lead to an inherent danger of polarization.

Present-day Thai society is culturally diverse. Over the centuries, Thailand has accepted many immigrants with different backgrounds. Such diversity has benefited the country in the past; although this fact still needs official acknowledgment. According to the United Nations, minorities should not be forced to give up their traditions. Specifically the problems in the South highlight the fact that the 2001 Universal Declaration on Cultural Diversity is of utmost relevance:

“culture should be regarded as the set of distinctive spiritual, material, intellectual and emotional features of a society or a social group, and that it encompasses, in addition to art and literature, lifestyles, ways of living together, value systems, traditions and beliefs”. It is relevant to “identity, social cohesion, and the development of a knowledge-based economy”. Hence, “respect for the diversity of cultures, tolerance, dialogue and cooperation, in a climate of mutual trust and understanding, are among the best guarantees of international peace and security.” Greater solidarity can be achieved “on the basis of recognition of cultural diversity”. (all taken from the Preamble). *Article 4 – Human rights as guarantees of cultural*



diversity

“The defence of cultural diversity is an ethical imperative, inseparable from respect for human dignity. It implies a commitment to human rights and fundamental freedoms, in particular the rights of persons belonging to minorities and those of indigenous peoples. No one may invoke cultural diversity to infringe upon human rights guaranteed by international law, nor to limit their scope.”

The Declaration strongly endorses positions that enhance appreciating cultural diversity as a positive contribution towards non-violence and peace. UNESCO calls for the Declaration’s “effective application” as a way to assist vulnerable groups, as well as preserving the cultural wealth of the world.

“In our increasingly diverse societies, it is essential to ensure harmonious interaction among people and groups with plural, varied and dynamic cultural identities as well as their willingness to live together. Policies for the inclusion and participation of all citizens are guarantees of social cohesion, the vitality of civil society and peace. Thus defined, cultural pluralism gives policy expression to the reality of cultural diversity. Indissociable from a democratic framework, cultural pluralism is conducive to cultural exchange and to the flourishing of creative capacities that sustain public life.”

Article 2 – From cultural diversity to cultural pluralism

Raising awareness of the need to embrace diverse ethnic Thais into the fold of Thai society and to endorse its relevance and the benefits of accepting such individuals into the fold is paramount to eliminating any opportunities for distrust and anger to grow. This may not come easily to people, as long as their own children are ‘held down’ and kept ‘silent’; granting a ‘voice’, ‘free choice’, and ‘equality’ to others, particularly to strangers, will no doubt seem a far-fetched idea to traditional Thais.

Tasks Ahead

Dispensing appropriate parenting and life-skills, demonstrating rational decision making, as well as mediation techniques, need to be instilled, especially, into the younger generation so as to

- Counter the constant fear of offending others or of losing one’s face, pervades any contact or communication. Demonstrate how to express one’s opinion freely while respecting and appreciating that of others.
- Urgently equip schools (qua curricula and teachers’ training) to teach skills



for decision-making and critical thinking, - and for

- Raising team spirit as well as laying down the skills for teamwork in schools and in the workplace;

- Impart to government agencies and NGOs, but also a wider public, a need to show concern for others and to have them pursue matters of mutual interest. The goal of this initiative would be to encourage people to see themselves as part of a wider community and of something larger than their family or their workplace, but as important.

- Undertake concerted efforts at consensus and community building; inclusion, gender equality and integration of minorities should be fostered;

- Strengthen ability of forming and maintaining coherent social groups and associations above the level of family and intimate peer groups (patrons and clients or groups of classmates) that represent groupings of diverse people like parties, unions or other such associations of people unrelated by kin but linked by common interests;

- In the context of a modern fast changing society with a vast array of open media and communication channels, disseminate timely information on relevant current and upcoming events and issues so as to achieve broad participation at the community level for planning and conduct of communal tasks needs be sought and institutionalized.

First Steps

Probably no better place to start than with the family, that assembles both sexes and several generations under one roof and thus is ideally suited to launch a renaissance and revival of traditional values and harmony, as well as a re-orientation towards communal values and concerns. A second such wave targeting strategic multipliers and change agents ought to be aimed at temples and schools, a third at the media, would target social cohesion and solidarity, so as to enhance a communal spirit.

For this, parents need to be offered appropriate parenting skills via the media. Teachers should offer fresh approaches to parenting or teaching skills, via courses in a new role media practitioners. By joining forces, parents and teachers can target the youth, as well as the community and address potential crucial causal factors and high risk groups. Appropriate life and decision making skills need to be imparted too.

In general, conflict resolution and negotiating skills and appropriate mediation techniques need to be extended to a multitude of stake holders. To this end appropriate



personnel need to be selected and trained. Also, nodal points (junction points in a transmission system) need to be identified and recruited, such as, universities, also specialized institutes, teacher colleges, PTAs or rural health centres. As crucial catalysts and ‘multipliers’ the media (radio and TV) via journalists’ associations and private/public stations need to be involved, as well.

Two special nation-wide programmes for furthering trust, cooperation and enhancing communal spirit are worth considering:

- **Taking Up Dialogue**

At present (March 2010), with the opposing sides seemingly unable or unwilling to enter civilized dialogue, a major step towards advancing non-violence and peace within Thai society would be to arrange a nationwide public dialogue, to present a public forum for issues that are causes or effects and thus the basis of the current challenges, confrontations and conflicts. These issues, discussed in an organized way, and a civilized manner in the public arena and on neutral ground, could constitute a major accomplishment in this current era of permanent confrontation.

For this, though, a culture of public dialogue is required; components and mechanisms of a social, as well as an inter-generational and rural-urban exchange of opinion need to be developed. Such dialogue would set the scene for articulating concern and for arriving at consensus, compromise and contribute - through its very presence - towards solidarity and cooperation amongst diverse segments of society including the rural-urban, young-old, educated-less educated, employers-employees.

Its first positive impact would be to reach out and motivate a wider participation in public and political affairs. A responsive dialogue bringing together the various stakeholders at one forum; thus furthering positive relations. These can be direct relations between members of civil society or relations between governmental authorities and civil society, to address concerns on a variety of matters. Participants would come from the public and private sectors as well as ‘civil society’.

The aim is to debate certain issues and come up with answers and suggestions for action. The goal is to have an ongoing dialogue on issues of current concern and present a platform for an exchange of opinions at every level of society. This would introduce a structured and qualitative dialogue and device for the authorities and institutions to take into account the concerns and aspirations, opinions and ideas from a wider public. It would also help improve accountability and transparency on the part of those who govern and hence contribute to making policy and administration more inclusive, by providing a platform for diverse inputs from



all stakeholders.

Examples of such dialogue activity may include mutual information, open discussion, coordination of their actions, and exchanges of opinions, consultation and negotiation. Initially, so as to avoid confrontation, issues discussed ought to be less divisive, political or ‘explosive’ and where consensus is inherent, e.g. the issues surrounding public parks, pollution.

- **Promoting Community Action**

Non-violence or peace, in some ways, cannot be taught but the conditions and the framework that make it possible and/or sustainable can be transmitted to the people concerned. Non-violence and peace are becoming attractive and worth investing in or defending, when everyone feels they have a stake in the current situation and something to lose should it be disturbed. In order to enhance community spirit and pride as well as to transmit a sense of belonging to something greater, these ideas ought to be shared with a great many others when planning, performing or watching joint activities of mutual interest.

Within a great many communities scores of Government agencies, NGOs, companies, and the like are already conducting many such activities. However commonly these are disjointed, uncoordinated efforts, not performed at the same time, and without the participants being aware of being part of a communal, provincial or national effort. This is very much the case with the Father’s, Mother’s or Children’s Day celebrations, which are not repeated throughout the year to highlight more mundane yet positive purposes or local concerns, such as joint projects to clean up a canal, river, or community, planting trees or competitions in sport or entertainment, at a communal or provincial basis – but, preferably, not organized as usual from the top by authorities or commercial sponsors but by ‘the people’ themselves.

For example a few schools could come together, and have a brainstorming session to come up with a topic and a plan, as well as a prospective date and location and to then take these up with authorities, NGOs and the private sector. Media should be invited to announce and to cover such events. By jointly taking community action, solidarity and a group spirit and pride is enhanced. The prime purpose – apart from just having fun – is a hope to garner a commitment, at a personal, as well as a group level, to engage and practice a basic yet effective level of solidarity and cohesion in a community. The benefits of raising the communal spirit can be major.

In a similar spirit, sports and entertainment games between competing communities or provinces could be arranged and pairings could reflect the diversity of the country bringing together disparate communities and regions. All this could



lead to much improved teamwork, collaboration and cohesion.

Community Action - its social dimensions yet unknown participation in such joint activities can have an enormous positive effect on the community or the country. Essential is: Focus clearly, One Theme at One Time Carried Out Everywhere: "Together Let's Make our Community Green, Clean, Happy!"

Towards Non-Violence and Peace

Neither non-violence nor peace is a static condition, but a confluence of positive traits, actions and events. Peace in society is not a constant state of affairs, but requires perpetual work, joint voluntary efforts of a great many – only feasible where all are part of the wider society. Participation and contributions of all members of society require joint efforts of all, but for this to occur, all need to feel included, as well.

NON-VIOLENCE needs to begin at 'Home', to be replicated a few million times over the Country; then PEACE can come and stay in Society.

What can or must the Thai family do? What can Thai society contribute towards a Culture of Peace and Non-Violence? Socialization needs to convey a sense of mutual dependence and responsibility outside of the confines of the family and prepare the individual for open communication, cooperation and compromise in the public and political sphere. At school education needs to impart an intense aversion towards abuse or violence, as well as, a general sense of fairness and inclusion. Education needs to foster a spirit of cooperation and solidarity that also embraces weaker segments of society and includes minorities which will lead to long-term solutions.

But even if family or school succeed in this endeavor against all the odds, major challenges and prerequisites for a conflict-free Thai society still persist, as there are other deterring forces or major hindrances and constraints well out of its control or reach, such as the wide economic disparity and a divisive political climate. These need to be addressed in the medium-term.

Lest we forget, though, for amending the way society operates or augmenting school curricula to result in tangible effects or to take hold throughout society and country, it might require the combined efforts of an entire generation or more. Hence, implementing these suggestions right now would not alleviate the present urgent concerns, (albeit preparing society better for modern life) of individuals or communities and their need to be governed by peace and non-violence.



References

- Galtung J, 1969. *Violence, Peace, and Peace Research*. Journal of Peace Research, Vol. 6, No. 3, 167-191.
- Galtung J, 1996. *Peace by Peaceful Means*. London: Sage.
- Gandhi MK, 1993. *An Autobiography: The Story of My Experiments With Truth*. Boston, MA: Beacon Press.
- Gandhi MK, 1941, revised in 1945, 1991 repr. *Constructive Programme, Its Meaning and Place*. Ahmedabad: The Navajivan Trust.
- King ML jr., 1963. "I Have a Dream," August 28, 1963. Washington D.C.
- King, ML jr., 1964. "Nobel Prize Acceptance Speech," December 10, 1964. Stockholm.
- King ML jr., 1964. "The Quest for Peace and Justice," December 11, 1964. Stockholm.
- Ramsbotham O, Woodhouse T, Miall H, 2005. *Contemporary Conflict Resolution: the Prevention, Management and Transformation of Deadly Conflicts* (2nd ed.). Malden, MA: Polity Press.
- Rupesinghe K, Anderlini SA, 1998. *Civil Wars, Civil Peace: An Introduction to Conflict Resolution*. London: Pluto Press.
- Spielmann S, 1992. "Family: Sources of Problems and Resources in the Far East Culture. Harnessing Resources of the Family in Asia: The Case of Thailand". Proceedings XVth World Conference of Therapeutic Communities. Venice.
- Spielmann S, 1994. "The Family in Thailand and Drug Demand Reduction: Problem of Urban Thai Society in Transition." Contribution of the UNDCP to the International Year of the Family. United Nations Bulletin on Narcotics, 46 (1): 45-66.
- Spielmann S (ed.), 1994. *Drug Situation and Demand Reduction Activities in Thailand*. Bangkok: National Council on Social Welfare of Thailand.
- Spielmann, S 1996. "Gambling on Thai Society". The Nation: 8-9 Aug.
- Spielmann S, et al 2004. *Family: Restraining or Contributing Factors Towards Adolescents' Drug Problems in Bangkok Metropolis*. Bangkok: National Council on Social Welfare of Thailand.
- Tonry M (ed.), 1997. *Ethnicity, Crime, and Immigration: Comparative and Cross-National Perspectives*. Chicago: University of Chicago Press.
- UNESCO, 1996. *From a Culture of Violence to a Culture of Peace*. Paris: UNESCO.
- United Nations. General Assembly, 1948. *Universal Declaration of Human Rights*. December 10, 1948. San Francisco.



Further Reading

- Ackerman P, Duvall J, 2000. *A Force More Powerful: A Century of Nonviolent Conflict*. New York: St. Martin's Press.
- Burton JW, 1990. *Conflict: Resolution and Prevention*. New York: Macmillan.
- Eisler R, Miller R, 2004. *Educating for a Culture of Peace*. Portsmouth, NH: Heineman.
- Kemp G, Fry DP (eds), 2004. *Keeping the Peace: Conflict Resolution and Peaceful Societies Around the World*. New York: Routledge.
- Kriesberg L, 1992. *International Conflict Resolution*. New Haven, CT: Yale University Press.
- Kulipossa FP, 2004. "Decentralisation and Democracy in Developing Countries: An Overview", in *Development in Practice*, 14 (6).
- Pelton L, 1974. *The Psychology of Non-violence*. New York: Pergamon.
- Post JM, 2004. *Leaders and Their Followers in a Dangerous World: The Psychology of Political Behavior*. Ithaca, NY: Cornell University Press.
- Pruit D, Kim SH, 2003. *Social Conflict*. New York: MacGraw-Hill.
- Ross MH, 1993. *The Management of Conflict*. New Haven, CT: Yale Uni Press.
- Shalit B, 1988. *The Psychology of Conflict and Combat*. New York: Praeger.
- Sharp G, 1973. *The Politics of Nonviolent Action*. Boston, MA: Porter Sargent.
- Smoke P, 1999. Understanding Decentralization in Asia. An Overview of Key Issues and Challenges. *Regional Development Dialogue*, 20 (2): 1-17.
- Smoke P, 1999. "Understanding Decentralization in Asia: An Overview of Key Issues and Challenges". *Regional Development Dialogue*, Vol. 20, No. 9, 1999 and in Kammeier, D and Demaine, H (eds). (2000): Decentralization, Local Governance and Rural Development, Bangkok: Asian Institute of Technology.
- Wallensteen P, 2002. *Understanding Conflict Resolution: War, Peace and the Global System*. London: Sage.



Peace and Non-Violence in Phra Aphai Mani, A Poetic Tale by Sunthon Phu

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Abstract

Phra Aphai Mani, a poetic tale by Sunthon Phu, one of the great poets of Thailand, is significantly concerned with peace and non-violence, which makes it stand out from other Thai literature of his time. The very name of the hero, which is also the name of this long poem, means the Jewel of Forgiveness. Phra Aphai Mani chooses to study music instead of undertaking any martial art more fitting for a future king. He believes that music can stop anger and violence. Both Phra Aphai Mani and Utsaren, a Lankan prince, love the same princess of Phaluek who does not care for Utsaren. This leads to wars between Phaluek and Lanka. Phra Aphai Mani tries to avoid bloodshed by the use of music. To end the long war, the holy hermit from the Crystal Isle is invited to preach to the two warring sides and bring about reconciliation. The hermit preaches the end of anger and revenge and recommends the practice of friendship and compassion. When the war is over, Phra Aphai Mani forgives his enemies, sets them free, gives back their possessions and provides them with transports to return to their respective country. Towards the end of the tale, Phra Aphai Mani gives up his throne and worldly wealth. He becomes a hermit who preaches that all human-beings must die and leave their possessions behind. It is a hint to all to give up greed, anger and attachment to transient things. Non-violence is recommended in order to attain peace.

Key words: Peace and non-violence, Phra Aphai Mani.

Introduction

Sunthon Phu (C.E. 1786-1855) is one of the great Thai poets (See Picture I). His works are numerous and *Phra Aphai Mani* is generally agreed to be his best work. *Phra Aphai Mani* is a long poetic tale about the life of Phra Aphai Mani, the main hero, and the life of his brother Sisuwan. Phra Aphai Mani's sons: Sinsamut, Sudsakhon



Picture I

Wax Image of Sunthon Phu

Owner: Thai Human Imagery Museum



and Mangkhala also play important parts that make the story interesting and exciting right to the end.

The name “Aphai Mani” means the Jewel (mani) of Forgiveness (aphai). It seems that Sunthon Phu may intentionally name his hero in order to convey his great message of forgiveness. If the virtue of forgiveness is not maintained, wars and conflicts will occur unceasingly. Peace and non-violence cannot be achieved without forgiveness.

Before discussing the concepts of peace and non-violence in *Phra Aphai Mani*, the meanings of the two words should be agreed upon. The meaning of peace or shanti in Sanskrit, according to the Hindu belief and also the Buddhist belief, means the condition of the mind that is calm and undisturbed by any destructive feelings such as anger, revenge, greed. Non-violence is the inadequate translation of the word Ahimsa in Sanskrit. Mahatma Gandhi explains that Ahimsa means love for mankind, compassion and tolerance without which Ahimsa cannot be attained. Ahimsa must be expressed in the heart, words and deeds. Ahimsa is very hard to achieve. In Gandhi’s own words, “We may never be strong enough to be entirely non-violent, in thought, word and deed. But we must keep non-violence as our goal and make steady progress towards it ... The truth of a few will count. The untruth of millions will vanish even like chaff before a whiff of wind.” (Singh, 2009,23)

In short, peace means more than a peace treaty and non-violence means more than ceasing the use of violence. Peace or Shanti, and non-violence or Ahimsa, must originate from a heart that is well-controlled to generate calmness, love for all beings, compassion, tolerance, and forgiveness. Peace and non-violence must go hand in hand, being motivated by sincere love for mankind and true forgiveness.

Why Phra Aphai Mani is an outstanding work

The Tale of *Phra Aphai Mani* is different from other tales of Sunthon Phu’s time. Most literary works of his period are about wars and stress the martial prowess of the heroes. The prominent works are of foreign origins such as the *Ramakien* from the Indian *Ramayana*, *Inao* from the Panji Romance of Java, Indonesia, and Sam Kok from the Chinese *Tale of the Three Kingdoms*. Although *Phra Aphai Mani* is also about wars with foreign lands, the tale is about the Thai people and there is a hint that Rattana is in fact the Thai capital, known officially as Rattanakosin. The story is created from the imagination of Sunthon Phu, not a foreign story retold in Thai. However, Sunthon Phu may be influenced by a Chinese chronicle named Sai Han which relates the story of a great piper who can play the pipe and induce swans



and peacocks to dance. His song can also make soldiers think of their home and family and no longer wish to fight. In *Phra Aphai Mani* the pipe song not only makes soldiers think of their home but also sends them to sleep. Additionally, the pipe has the power to kill too. The use of the staff as a war weapon is also of Chinese origin. Sisuwat, Phra Aphai Mani's younger brother, is a talented fighter with his staff. Yet this does not make *Phra Aphai Mani* less original. Sunthon Phu is only capturing the trend of the time.

Sunthon Phu was very much aware of the current events of his time. For example, he knew that Lanka (Ceylon, now Sri Lanka) was ruled by the Europeans during his time. He knew about foreign nations such as England, France, and Holland, besides Asian races such as Javanese, Malays, Tamils, Chinese. Phra Aphai Mani, the hero, learns to speak foreign languages fluently while he lives with shipwrecked people in the Crystal Isle. The music box in the story is the forerunner of the gramophone and the Pirate Surang's gigantic ship is the forerunner of the Titanic.

The most important of all, Sunthon Phu recognizes the value and the power of music. Phra Aphai Mani explains to the three Brahmins: Mora, Sanon and Wichian,

“The worth of music, it includes all things
Of untold value, like a priceless gem.
Humans, garudas, heavenly beings,
Four-legged beasts that roam the jungle wild,
Upon hearing the music from my pipe,
All lose their rage and wildness.
Calm they become, and sleep unknowingly.
An art of such great merit music is.”
(*Phra Aphai Mani* Part I. 1999, 21)

In *Phra Aphai Mani*, the hero puts music to good use, i.e., when all else fails to bring peace, Phra Aphai Mani plays his pipe to achieve peace. In *Sai Han*, music is only a war weapon while in *Phra Aphai Mani*, the chief hero Phra Aphai Mani uses music to avoid violence, to stop the fighting and killings.

The concept of music in *Phra Aphai Mani* is never out of date. Zubin Mehta, celebrated Indian conductor and music director, gave an interview on October 24, 2010 to the Bangkok Post. He says that he has been a political activist of sorts, holding public performances in areas of unrest. His mantra is “music has the power to create understanding and make things well again.” (Woolsey B, 2010, 12)



Sunthon Phu uses the pipe music as the symbol of peace and non-violence. All beings, be they human-beings or wild animals become calm, lose their rage and no longer fight against one another.

On the surface, Phra Aphai Mani may seem a weakling. He often weeps out of compassion. Yet he has the great quality of the strong: the ability to forgive. Mahatma Gandhi says, “The weak can never forgive. Forgiveness is the attribute of the strong.” (India Perspectives, Jan.-Mar. 2008, 23) Phra Aphai Mani and also one of his sons, Sudsakhon, are strikingly forgiving persons.

Although Phra Aphai Mani and Utsaren are rivals in their love for Princess Suwannamali, Phra Aphai Mani tries to be helpful to Utsaren who once let Phra Aphai Mani and his companions travel on his ship. He loves Utsaren as his brother and feels indebted to him. When Utsaren insists on fighting to obtain Suwannamali from Sinsamut and is finally captured by the latter, Phra Aphai Mani rushes to ask his son to forgive Utsaren and set him free. Phra Aphai Mani feels that the fight is futile. (See Picture II)

“We should not have fought each other,
Wasting our men’s lives.”
(*Phra Aphai Mani* Part III, 2004, 165)

Sudsakhon, Phra Aphai Mani’s son born from the mermaid, (See Picture III) is also full of forgiveness. The naked ascetic steals his dragon horse and magic cane, and pushes him down a chasm to die. The boy is rescued by the hermit of the Crystal Isle and regains his horse and cane. The King of Karawek who has heard of the crime wants to kill the naked ascetic but Sudsakhon says,

“I do not seek revenge on him.
For I believe it’s due to my past karma.
If we kill him, the karma is repeated
And I’ ll suffer from it for a long time.”
(*Phra Aphai Mani* Part IV, 2006, 153)

Although Sunthon Phu does not mention that Sudsakhon is a Buddhist, it is quite clear that Sudsakhon believes in the doctrine of Karma and non-violence or Ahimsa.

Sunthon Phu points out in a subtle way the bad effect of revenge and



Picture II

Standing from left to right:

Utsaren, Sinsamut, Phra Aphai Mani, Sisuwani.



Picture III
The hermit is blessing Sudsakhon, son of the mermaid.



violence. When Utsaren and his father, King of Lanka, come to attack the Kingdom of Phaluek, Utsaren is captured. Wali, a clever woman commander, feels that if Phra Aphai Mani sets him free, the next battle will be even bigger. She therefore taunts Utsaren until he dies of rage, coughing blood. As a result, Wali is killed by Utsaren's ghost. Utsaren's younger sister Laweng Wanla seeks revenge for her father and brother. Thus in spite of Utsaren's death, the war becomes bigger and costs more and more lives.

Phra Aphai Mani has to use his pipe music to reduce the violence and deaths caused by so many wars. Finally, he takes his troops to attack Lanka, hoping to put an end to the war. Yet the war gets bigger and causes more casualties. When the troops of the two sides fight fiercely, Phra Aphai Mani plays his pipe to stop the carnage. (See Picture IV)

“Phra Aphai struck up a sentimental air,
 Diverting all to the fond memory of their lands.
 ‘We left home as birds did to their nests.
 People at home must look forward to our return.
 At dusk, beaten gongs will make men weep,
 And lament with keen nostalgia.
 Moon and stars float in the late night sky,
 And dewdrops cool the night, dampening the air.”
 (*Phra Aphai Mani* Part V, 2008, 175-176)

However, the power of music is not enough. The great guru has to set up the ritual to invite the holy hermit of the Crystal Isle to preach to the warring sides.

“Be not angry, jealous and vengeful,
 Think that it's due to your past karma.
 You reap what you have sown.
 Blame none but yourselves for your deeds”
 One thing is that we lack religion.
 The whole world is suffering now.
 To end the heat of war and bring peace,
 We must be friends and be compassionate.”
 (*Phra Aphai Mani*, 1994, 884, not yet published in English)



Picture IV
Phra Aphai Mani plays on his pipe,
sending all to deep sleep.



When the war finally ends, Phra Aphai Mani shows his magnanimity by granting forgiveness to his captured enemy. He returns all the seized possessions and men to them and gives them sloops to travel to their respective kingdom. Peace and non-violence can only be achieved through forgiveness, friendship and compassion.

Near the end of the story, Phra Aphai Mani gives up his throne and becomes a hermit. He preaches the way to reach the highest good: one must realize that all beings in this world, be they low-born or high-born, will die. None can escape death. Knowing this, one should become less greedy and stop seeking revenge. To attain peace and non-violence we should become friends and be compassionate to one another. Most of all, we must learn to forgive. Only forgiveness can end revenge and conflicts.

References

- Gandhi, MK, 1993. *An Autobiography or The Story of my experiments with truth*. Ahmedabad: Navajivan trust, 342-344.
- Singh, Savita, 2008. Satyagraha, Gandhi's Concept Of Non-Violence. *India Perspectives*: 23.
- Singh, Savita, 2009. Gandhi's Legacy of Global Nonviolence. *India Perspectives*: 20-23.
- Sunthon Phu, 1994. *Phra Aphai Mani* (in Thai). Bangkok: Bannakhan Press, 884.
- Sunthon Phu, 1999. *Phra Aphai Mani Part I* (English Translation) Bangkok: Office of the National Culture Commission, 21.
- Sunthon Phu, 2004. *Phra Aphai Mani Part III*. (English translation) Bangkok: Ministry of Culture, 165.
- Sunthon Phu, 2006. *Phra Aphai Mani Part IV* (English Translation) Bangkok: Ministry of Culture, 153.
- Sunthon Phu, 2008. *Phra Aphai Mani Part V*. (English Translation) Bangkok : Ministry of Culture, 175-176.
- Woolsey, Barbara, 2010. Maestro strikes right note in discordant lands. *Bangkok Post*, October 24, 2010:12.



Public Opinion and the Limit of China's “Peaceful Rise”

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Abstract

Public opinion has played an important role in the making of Chinese foreign policy since Deng Xiaoping's institution of economic reform in 1978. Chinese citizens, with the coming of commercialized media and information technology, have more latitude to express their own views on international affairs, which are sometimes different from those held by the authorities. Therefore, it is difficult for the Chinese leadership to get the people to conform to official foreign policy orthodoxy, including the concept of “Peaceful Rise” propagated by the Chinese Communist Party and the government. Emotional outbursts during the anti-American and anti-Japanese protests in 1999 and 2005 respectively reminds us that China's “Peaceful Rise” has been challenged by the violence and anger of its own people.

Key words: Public opinion, foreign policy, China, Peaceful Rise

Introduction

At the Boao Forum for Asia in China's Hainan province in November 2003, Zheng Bijian, former vice president of the Central Party School and one of the Chinese Communist Party's (CCP) leading thinkers and writers on ideological questions, proposed the concept of “Peaceful Rise” by stating that China at the beginning of the 21st century faced two major problems: one concerned multiplication. Multiplied by 1.3 billion, any social or economic problem, no matter how small it is, will become a huge problem. The second one concerned division. Divided by 1.3 billion, China's resources, no matter how abundant they are, will be at extremely low per capita levels. As a result, in order to achieve its development goals, China had no choice but to take part in economic globalization, pursue a road of independent development, and adhere to peace and never seek hegemony (Zheng



Bijian, 2005: 14-19). Since then, the concept of “Peaceful Rise”, used interchangeably with “peaceful development”, has become key phrase in many speeches on foreign policy by China’s leaders and diplomats.

In the interview with Chinese writer Ye Xiaoshen on September 10, 2004, Zheng Bijian revealed that the concept of “Peaceful Rise” is in fact an antidote to the so-called “China Threat Theory” which has been popular in the West since the early 1990s. The theory, he said, “is that if China moves ahead and becomes stronger, it will vie for resources and seek expansion”. Zheng’s immediate reaction was that a reply was needed and he should respond “based on the facts and basic experience of China’s development” (Zheng Bijian, 2005: 56). In this article, the author argues that, although the Chinese leader has chosen to strive for a peaceful rise, its discourse has been challenged by the rise of public opinion in the globalized world. Facilitated by the Internet and a more commercialized publishing industry, public opinion in China has been more diverse and sometimes become a limit to official foreign policy orthodoxy including the concept of “Peaceful Rise”.

The Role of Public Opinion in Chinese Foreign Policy

Public opinion has played an important role in the making of Chinese foreign policy since 1978. Entering the reform era, the state has diminished its control over society and citizens have enjoyed considerably more latitude to speak their minds in private and public, as long as they respect the “Four Cardinal Principles” laid down by supreme leader Deng Xiaoping in 1978; i.e. Marxism-Leninism-Mao Zedong Thought, the socialist road, the people’s democratic dictatorship, and the supremacy of the CCP (Shambaugh, 2000: 184). In other words, the “public sphere” developed in post-Mao China.

Although the media are still under the control of the government and the CCP, they have been encouraged to be more commercialized in order to reduce the state’s financial burden. Advertisements are permitted and publishers tend to publish news, articles, and opinions on public issues whose contents are more interesting and different from official orthodoxy, in order to attract readers and make profits. Therefore, media like *People’s Daily*, the official newspaper of the CCP, attracts fewer readers. Liu Dabao, a senior researcher of People’s Daily’s research office told Thai researchers in October 2003 that its sales decreased from 7 or 8 million issues per day in the Maoist era to 2 million issues per day after Deng’s institution of reform (Utamachan and Utamachan, 2006: 94-95). As Qing Cao (2007) argues, “the growing partially deregulated market forces, though under tight control,



could still combine with a potential societal push for quality information and wider participation in public affairs”. Therefore, what the Chinese government and the CCP call “pacifist foreign policy” might not always be supported by their own citizens.

An indication of differences between official foreign policy orthodoxy and public opinion occurred in 1996 with the publication of *China Can Say No*, a book edited by Zhang Xiaobo. On the one hand, the book criticized American aims to contain China’s growth; e.g. the CIA secret mission in China, the support for Tibet’s independence, the protracted negotiation over China’s bid to join the World Trade Organization (WTO). On the other hand, it also charged that the Chinese government was naïve and soft in its dealing with the United States, and that it should dare to “say no” to Washington (Fewsmith and Rosen, 2001: 163). The book quickly became a bestseller, selling as many as 2 million copies, reflecting that many people read it and shared the same frustrations as the authors. A few years later, their frustrations resulted in an outburst of protests against foreign powers.

Anti-American Protests in 1999

Claiming that Serbian President Slobodan Milosevic had committed genocide crime in the province of Kosovo, the Bill Clinton administration, on behalf of the North Atlantic Treaty Organization (NATO), began its war with Serbia in March 1999. On May 7 of that year, the Chinese Embassy in Serbia’s capital city of Belgrade was bombed by NATO’s air force, leading to the deaths of three embassy personnel and the injuries to more than twenty. The next day, hundreds of thousands of people protested in cities across China, attacked the US Embassy in Beijing with stones and eggs, burnt the American flag, and shouted “kill Americans” (Hughes, 2006: 85).

The Belgrade Incident became a dilemma for the Chinese leadership. On the one hand, the government at that time wanted to sign an agreement with the US on the terms of China’s WTO accession by the end of 1999, which would be a symbol of President Jiang Zemin’s success in integrating China into the global economic system on the occasion of the 50th anniversary of the People’s Republic of China (PRC). As a result, the Chinese leadership did not want to overreact to the incident. On the other hand, however, banning a protest was not an option because the protesters might see it as a “weakness” of their leaders and redirect their outburst of anger at their own government, or even question the legitimacy of the CCP’s authoritarian rule.



A carefully-balanced action by the Chinese government took place in the televised speech by Vice President Hu Jintao on May 9. Hu made an official protest against the bombing of the embassy, demanded an emergency meeting of the United Nations Security Council (UNSC), and acknowledged the Chinese people's right to express their anger and patriotism on the condition that the protests should be carried out within the law, in order not to disrupt social order. Meanwhile, he declared that China would not be moved from its foreign policy of independence, self-sufficiency, and peace (Hughes, 2006: 85). It meant the incident would be a short-term crisis that would not affect the overall relations and cooperations between China and the US. However, the protesters' outburst of anger and attacks on the American Embassy in Beijing had already become news around the world and tarnished the "peaceful" image of China. Six years later, their anger became obvious again in the case of Japan.

Anti-Japanese Protests in 2005

In the "collective memory" of many people in China, Japan has been perceived as an aggressor who invaded China several times during the so-called "the Century of Humiliation" (1840-1949) and has not apologized to China for its atrocities. *March of the Volunteers*, the national anthem of China composed during Japan's occupation of northeastern China in the 1930s, is full of anti-Japanese sentiments. In other words, the problem of history still haunts Sino-Japanese relations.

Anti-Japanese protests in China on April 9-10, 2005 were the result of a coincidence. The first was Japan's Ministry of Education's approval of eight history textbooks to be used in secondary schools. Many Chinese citizens claimed that their content glorified Japan's war with China. The second was Japan's bid to become one of the permanent members of the UNSC. More than 20 million Chinese "netizens" signed their names to protest against the bid, saying that an unrepentant nation like Japan is ineligible for a permanent seat on the council whose mission is to maintain world peace. In Beijing, tens of thousands of people marched to the Japanese Embassy and the residence of Japan's ambassador, and smashed windows in these buildings to show their frustrations. Meanwhile, tens of thousands of people in Shanghai destroyed Japanese stores, companies, and cars on their way to the Japanese Consulate. The crowd chanted anti-Japanese slogans such as "Japan doomed", "Go away Japanese" (Khamchoo, 2005: 49-50).



Again, as with the anti-American protests six years before, the Chinese leadership faced a dilemma. On the one hand, China's economic interests with Japan were considerable. By the end of 2004, arrival trade volume between the two countries had reached 167 billion US dollars and Japan had replaced the US as China's biggest trading partner. Also, more than seventy thousands Chinese students were studying in Japan (Theeravit, 2006: 113). On the other hand, failing to take the issue of history seriously could be detrimental to the CCP's legitimacy. In 2003, Ma Licheng, an editorial writer of *People's Daily*, and some Chinese scholars proposed what is called "New Thinking" on Sino-Japanese relations. They held the view that China should abandon the issue of history in dealing with Japan. Moreover, it should recognize and value the economic aid that Japan had given to China since 1979 in the form of soft loans. However, their proposal aroused criticism, not only from scholars, but also from many citizens and netizens who denounced Ma as a "traitor" (Hughes, 2006: 149). Therefore, following "New Thinking" was not an option for the Chinese leadership, as it could easily arouse anti-CCP sentiments.

The protests made it difficult for the Chinese government to keep a balance between "peaceful" foreign policy orthodoxy and "violent" popular sentiments. In his meeting with Kyodo News Agency's president Toyohiko Yamanouchi on April 12, Chinese State Councillor Tang Jiaxuan said that the Chinese people could not really understand how a nation which was unable to honestly look at its aggressive history and correctly understand the feeling of the people of the countries it had victimized could be qualified to bid for a permanent seat on the UNSC. At the same time, Tang assured Yamanouchi that China and Japan "should look forward into the future and be friends forever" (Handling China-Japan Ties Carefully, 2005, April 28: 16). After allowing the people to vent their anger for a few days, the Public Security Bureau of Beijing Municipality on April 15 made a declaration that any protest without official permission would be considered illegal and assured the people that the government and the CCP would handle Sino-Japanese ties in a proper manner (Theeravit, 2006: 114).

The outburst of anger and the government's reactions to the two incidents revealed the growing importance of public opinion in the making of Chinese foreign policy. Despite the fact that the government and the CCP have maintained their media control mechanism, Chinese citizens in the age of commercialized press and information technology have their own windows to the outside world, reducing the state's ability to influence public opinion. Moreover, the Chinese leadership had to give more space to the people to express their frustrations. Otherwise, they could



redirect their frustrations towards their own government and the CCP's authoritarian rule would face a crisis of legitimacy. Hughes (2006) calls this phenomenon "the powerlessness of the powerful" because elite discourse is challenged by popular nationalism. In addition, the Chinese people have ambivalent attitudes towards their country's fate, described by Callahan (2010) as "pessoptimist" structure of feeling, which is a result of their country's grievous experience during "the Century of Humiliation". They are, on the one hand, confident about China's prosperous future. On the other hand, however, they feel that China has always been victimized by foreign powers. Their victim mentality thus easily leads to an outburst of anger and violence. In other words, the Chinese people do not always conform to the concept of China's "Peaceful Rise" propagated by their leadership.

Conclusion

Public opinion has played an important role in the making of Chinese foreign policy since Deng Xiaoping's institution of economic reform in 1978. Chinese citizens, with the coming of commercialized media and information technology, have more latitude to express their own views on international affairs, which are sometimes different from those held by the authorities. Therefore, it is difficult for the Chinese leadership to get the people to conform to official foreign policy orthodoxy, including the concept of "Peaceful Rise" propagated by the CCP and the government. Emotional outbursts during the anti-American and anti-Japanese protests in 1999 and 2005 respectively remind us that China's "Peaceful Rise" has been challenged by the violence and anger of its own people.

References

Thai materials

- Khamchoo C, 2005. *China and Japan: A Background History of Conflicts between the Two Major Powers and Implications for Asia in the 21st Century* (จีน - ญี่ปุ่น: ประวัติศาสตร์เบื้องหลังความขัดแย้งของสองมหาอำนาจและนัยต่อภูมิภาคเอเชียในศตวรรษที่ 21). Bangkok: Openbooks.
- Theeravit K, 2006. *New China in the 21st Century* (จีนใหม่ในศตวรรษที่ 21). Bangkok: Matichon Publishing House.
- Utamachan V, Utamachan N, 2006. *Chinese Media in Depth* (เจาะลึกสื่อจีน). Bangkok: Institute of Asian Studies, Chulalongkorn University.



English materials

- Callahan WA, 2010. *China: The Pessimist Nation*. New York: Oxford University Press.
- Fewsmith J, Rosen S, 2001. The Domestic Context of Chinese Foreign Policy: Does “Public Opinion” Matter?. In: *The Making of Chinese Foreign and Security Policy in the Era of Reform*. Lampton D. M, ed. Stanford, CA: Stanford University Press, 151-187.
- Handling China - Japan Ties Carefully, 2005, April 28. *Beijing Review*, 48(17): 16-17.
- Hughes CR, 2006. *Chinese Nationalism in the Global Era*. London: Routledge.
- Qing Cao, 2007. *Confucian Vision of a New World Order?: Cultural Discourse, Foreign Policy and the Press in Contemporary China*. *International Communication Gazette*, 69(5): 431-450.
- Shambaugh D, 2000. The Chinese State in the Post - Mao Era. In: *The Modern Chinese State*. Shambaugh D, ed. New York: Cambridge University Press, 161-187.
- Zheng Bijian, 2005. *China's Peaceful Rise: Speeches of Zheng Bijian, 1997-2005*. Washington, D.C.: Brookings Institution Press.



Śaivism in Thailand as Recorded in Inscriptions and Old Documents from Sixth Century to Early Ayudhyā Period

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Abstract

From the literary evidence the contact between India and Southeast Asia must have begun a few centuries before the Christian era. Śaivism, as one of the major sects of Hinduism, must have existed in Thailand, especially in the northeastern and eastern parts, as early as the 6th century CE, as evidenced by the earliest inscriptions written in Sanskrit. It can be assumed that the Thai people, who appeared in Southeast Asia as early as the 11th century CE, before the Sukhodaya period, must have adopted Buddhism as well as Hinduism as their religions, similar to the Mons and Khmers who also occupied the area which is now present day Thailand. Based on the high frequency of inscriptions belonging to Śaivism found in northeastern Thailand it is quite certain that Śaivism was very influential from 6th to the early 12th century. It began to decline during the time when the Buddhist King Jayavarman VII came into power between the later part of 12th century and the early 13th century. In spite of Singhalese Buddhism being adopted as the state religion by King Rama Khamhaeng, the third king of Sukhodaya, Brahmanism was also practiced along with Buddhism by the Thais, and this has remained the same in Thailand ever since.

Key words: Thailand Śaivism, inscriptions, old documents

Indian Contact with Southeast Asia

The region known collectively as *Suvarṇabhūmi* and *Suvarṇadvīpa*, roughly implied, in those days, Southeast Asia. “There are many references to sea voyages between Indian ports and *Suvarṇabhūmi* or *Suvarṇadvīpa* in old popular stories in the Sanskrit works based upon the lost Bṛhat-kathā, as well as Buddhist *Jātakas*, *Jain Samarāichcha-kathā* and other works. The heroes of most of these stories are



merchants and, in a few cases, princes, or chiefs in straightened circumstances, who wanted to acquire wealth by trade or other means. The *Kathākośa* relates the story of *Nāgadatta* who went to *Suvarṇadvīpa* with five hundred ships in order to acquire wealth. The Buddhist works *Milindapañha* and *Niddesa* also refer to regular trading voyages to *Suvarṇbhūmi*” (Majumdar 1963 : 7). An attempt has been made to prove that the Indianization of Farther India, or Southeast Asia, dates back at least to the *Maurya* Emperors (cir. third century BC). Cœdès is of a different opinion (1968: 16). According to him, neither archaeological and epigraphic documents nor foreign sources can be dated any further back than the *Niddesa* which dates, at the latest, to the very first centuries of the Christian Era. It enumerates a number of Sanskrit or Sanskritized places that may be identified with Farther India (1968:lo.cit.).

Bhavavarman I's inscription

This much damaged stone pillar inscription was discovered at *Bān* (village) *Vang Phai*, *Vichianburī* District, *Petchabūn* Province. From what remains, it appears that King *Bhavavarman*, who is equal to *Indra*, is the son of *Prthivīndravarman* and the grandson of a universal monarch (*cakravartin*). The inscription tells us of the erection of images of *Śiva* (Kaewkhilai 1986 Lem 1: 141; Cœdès 1964: 156-8). On the basis of this inscription, the territory of *Bhavavarman I* must have extended as far as *Petchabūn*, the north central part of Thailand. *Bhavavarman*, grandson of *Sārvabhauma*, the universal monarch, that is, of the king of Funan, was well known to be a Śaivite. He ruled *Chenla*, the Cambodian pre-Angkorian kingdom, which was constituted after gaining independence from the *Chams* during the second half of the sixth century. The center of the state can be located in the middle *Mekong*, in the region of *Bassac* (Cœdès 1968: 66).

Citrasen's Inscriptions (cir. seventh century CE)

Few inscriptions, each of which is basically a repetition of the earlier ones, have been discovered in *Ubonrātchathāni*, *Burītram* and *Khonkaen* Provinces. They tell us that *Citrasena*, who is the grandson of *Sārvabhauma*, and whose marks of characteristics are reputed (*āhatalakṣaṇa*), has, in spite of his being the youngest brother of *Bhavavarman*, obtained the name, after his coronation, of *Mahendrarvarman*, on account of his power (*śakti*). He is mentioned in the inscriptions to have erected *Śivaliṅgas* and the bull *Nandi* as the symbol (cihna) of his conquest over the entire territory (Kaewkhilai 1986 Lem 1: 155-67). Evidently, these inscriptions are among



the earliest documents that record the presence of Śaivism in Thailand. *Citrasena*, according to Coédès, was actually the cousin of *Bhavavarman* not the brother (1968: 68 n.20). King *Mahendravarman* ruled *Chenla* from circa CE 600 to circa CE 616 (1968: 69). Just very recently a version of this inscription which differs slightly from other versions was found in Roi-et Province. It says that *Citrasena*, grandson of *Sārvabhauma*, son of *Vīravarman*, is anointed king on account of his power in spite of his being the youngest brother of King *Bhavavarman*. He obtained the royal title as *Mahendravarman*. He, who is extremely devoted to the god whose emblem is a bull (*vr̥ṣadhvaṇa*), erected a bull made of stone, after having conquered the entire territory and after having removed (*apanīya*) the previous form of worship (*purātānī medhā*). *Purātānī medhā* here seems to refer to Buddhism which flourished in the kingdom of Funan during the reign of King *Rudravarman* (CE 514-cir.CE 550), its last king (1968: 60-1).

Mahendravarman is also mentioned in an inscription found at *Chong Sa Chaeng, Prāchīnburī* Province, to have dug a reservoir named *Śaṅkara* (Thipkesorn 1986 Lem 1: 43; Coédès 1964:152), which undoubtedly was related to Śaivism.

Cāruek (inscription) Phaen Thong Daeng Ūthong (cir. seventh century)

The inscription is on a copper plate and was dug up by Mrs. *Thaem Suadam* from her own land opposite *Ūthong Sueksālaya* School, *Ūthong* District, *Suphanburī* Province, in the west-central part of Thailand in CE 1957. It tells us that *Śrītharṣavarman*, grandson of King *Śrī Īsānavarman*, after ascending the throne, offered a palanquin decorated with gems and also an umbrella, to the accompaniment of dance and music etc. to *Śrīmad Āmrātakeśvara*, that is, venerated *Śiva* named *Āmrātakeśvara*. Thereafter, he offered a sheath for *Śivaliṅga* (*Śāmbhavakośa*) together with best ritual utensils and equipment to the accompaniment of dance and music to *Śrīdhareśvara*, (*Thongkhamvan* 1986:225-8). The names *Āmrātakeśvara* and *Āmrātakeśa* of *Śiva* are mentioned in a number of inscriptions of the pre-Angkorian period (Bhattacharya 1961: 51; Diskul 2004: 24; Coédès 1937: 8; Coédès 1942:149-50; Coédès 1951:159). There were two kings by the name of *Īsānavarman* in the history of Cambodia, namely, *Īsānavarman I* (616-c635) and *Īsānavarman II* (925). King *Śrītharṣavarman* who, according to this inscription, was King *Śrī Īsānavarman*'s grandson, appears to be a king who might have succeeded King *Bhavavarman II* (637-639), son of *Īsānavarman I* (*Prapandvidya* 2010:79-84). The date of the inscription should therefore be assigned to cir. 7th century. Figures 1 and 2 are the

pictures of the *Śāmbhavakośa* taken from the Guimet Museum in Paris. If this copper plate inscription is in situ there should be a temple of Lord *Śiva* named *Āmrātakeśvara* in the vicinity. *Ūthong* was an ancient town known in the inscription of King *Rāmkhamhaeng* of *Sukhodaya* as *Subarṇaburī*. King *Ūthong*, the founder of *Ayudhyā* used to rule here (Thabian Borānavatthu Sthān Thua Rāja Ānā Cakr 1973: 158-9).

Earliest inscriptions in Sanskrit bearing on Śaivism in the early period of Thailand



Figure 1 A golden sheath of a Śhivaliṅga from Champa at the Guimet Museum, Paris.



Figure 2 A sheath of a Śivaliṅga from Champa at the Guimet Museum, Paris.

Don Muang Toey Inscription (cir. seventh century CE)

The inscription was discovered at an ancient town known as *Don Muang Toey* situated in *Bān* (village) *Song Pluay*, *Tambol Song Pluay*, *Kham Khuan Kaew* District, *Yasothon* Province and was damaged to some extent. It was edited and translated into Thai by Cha-Em Kaewklai (1986 Lem 1: 168-75). From what remains, it tells us about a celebrated ruler of *Prajāsaṅkhapura*, *Pravarasena*.

He might have had a son called *Śṛtkroṅcabāhu* who in turn had twelve amazingly powerful sons. The youngest of them was known as *Śrī* (Añjali?) and because of his dedication to truth and religious acts for the people, the assembly of *Brāhmaṇas* added the word *Dharmasena* to his name. He appears to have had strong devotion to *Śiva*, and to have erected a shrine of *Śivaliṅga* at a pond.

Bān (village) Phan Dung Inscription (CE 829)

An inscription which dates back to CE 829 was found at *Bān Phan Dung*, *Khām Thale Saw* District, *Nakhonrāthasima* Province. It begins with a salutation to *Śiva* who is known as *paśupati*, the lord of creatures. He is described as having the sun, the moon and wind as his body; as being all-pervasive; as becoming one with the daughter of the mountain (*Pārvati*); as being the teacher of the demons and gods; as being resorted to by men and gods and as being a receptacle of excellence. The image of Lord *Harihara*, the combined form of *Hari* (*Viṣṇu*) and *Hara* (*Śiva*), which is adorned with the crescent moon, is mentioned to have been erected by an intelligent person (Prapandvidya 2004: 192-4). Figure 3 is a picture of *Harihara*

taken from the Guimet Museum in Paris. The inscription shows the syncretic nature of the religious beliefs of the region, where the inscription was located, as it mentions the erection of the image of *Harihara*, the combined form of *Śiva and Viṣṇu*, of the image of *Viṣṇu* and of the image of *Sugata*, that is, the Buddha. It is interesting to note that an inscription in Sanskrit written in the script of a somewhat earlier period (cir.seventh century CE) on a stone pedestal was discovered at Wat (monastery) *Cantuek*, *Tambol Cantuek*, *Pāk Chong* District, *Nakhonrātchasi* Province. It describes the erection of a Buddha image (*tāhāgati mūrti*) by the daughter of the king of *Dvāravatī* (*dvāravatīpati*). She was probably a queen of a certain king. The inscription is edited and translated by Cha-Em Kaewkhai (1986 Lem 1: 145-6). However, it seems that his translation may be incorrect. This inscription indicates that Buddhism was present in the area of *Nakhonrātchasi* Province earlier.



Figure 3 Harihara of the Phnom Da style of pre-Angkorian period, 7th century, at the Guimet Museum, Paris.



Inscription of *Bo Īkā* (CE868)

This inscription was found at *Bān* (village) *Bo Īkā* to the south of the old city of *Nakhonratchasima*, *Nakhonratchasima Province*. It is written in Sanskrit and Khmer. On one face it tells us that the King of *Śricanāśa* made a resolve to attain enlightenment, so he donated 20 female buffalos together with their calves and 50 cows also with their calves to the Buddhist Order. On the other face of the stone, it begins with an invocation to *Śiva* who is described as having fire, the sun and the moon as his eyes. He is the essential cause (*kāraṇasāraka*) of all things. He, who is extremely subtle, has a bull as his emblem. The inscription records the erection of a divine golden *Śivaliṅga* by *Aṃśadeva* in 790 of *Śaka* era (Thongkhamvan 1986: 23-8).

The inscription of *Bo Īkā* is a strong indication that the center of *Śricanāśa* is in the vicinity of the city of *Nakhonratchasima*.

Inscription of *Wat Bān Nong Nā Thui* (cir. 9th century)

The inscription was found in 2005 under the ground at the depth of 1.60 m, in a mound where a new Buddhist ordination hall was to be constructed. It is kept at *Wat* (Buddhist monastery) *Bān Nong Na Thui*, *Bān* (village) *Nong Nā Thui*, *Tambol Phutsā*, *Muang District*, *Nakhonratchasima Province*. It is fragmented and the three pieces that are found are badly damaged but it undoubtedly belongs to Śaivism. It begins with an invocation to *Paramātman* and to *Śūlabhṛt*, that is *Śiva*. King *Indravarman I*, who reigned at Angkor from CE 877 to CE 889 (1968:110-1), is mentioned in the inscription and the erection of a *Śivaliṅga* at *Devāśrama* is also mentioned.

The Inscription of *Śricanāśa* (CE937)

The inscription was found at a Brahmanic temple near *Cheekun Bridge*, *Muang District*, *Phranakhonśrī-ayudhyā Province*, in central Thailand. It is written in Sanskrit on one face and in Khmer on the other. Most probably it must have been brought from elsewhere. It begins with an invocation to *Śiva* who is described with the epithet of *Śaṅkara*; as having burnt the God of Love (*kāma*); and as having borne the petal of the heavenly flower in the form of a half moon, as if for fear that the world may be burnt (like *Kāma*). Additionally there is an invocation to the daughter of *Himavat* (*Pārvati*) who is described as forming a half of the body of *Hara* (*Śiva*). As a result *Guha* (*Skanda*) is perplexed as he is not sure whether she is his mother or

not. Then there is the genealogy of the kings of *Śricanāśa*, of which *Nāgadatta* was the first ruler. The inscription also tells us that *Maṅgalavarman*, brother of King *Narapatisimhavarman*, erected a statue of *Devī (Pārvatī)* representing his mother in 895 of the *Śaka* era. The Khmer part gives the name of slaves dedicated to the temple. (Cœdès 1986: 42-9).

The inscription of *Ubmung* (CE 993)

The inscription was discovered at Bān (village) *Ubmung*, *Vārinchamrāb* District, *Ubonrāthathāni* Province, in northeastern Thailand. The first verse, which is identical with that of the inscription of *Bān Tād Thong* (see Kaewkhilai 1986 Lem 3: 87), is an invocation to *Śambhu (Śiva)* who is described as having his matted hair shining on account of the rays from the untainted crescent moon, as having created parasols (to protect) the lotus-born one (*Brahmā*) and (to protect) the lotus-eyed one (*Viṣṇu*). (Khamtho 1986:131-2). Figure 4 is a picture of a head of *Śiva* taken from the Guimet Museum in Paris.



Figure 4 Head of *Śiva* of the style of Bakheng of Angkorian period, the end of 9th century to the beginning of 10th century, at the Guimet Museum, Paris.



***Prāsād Thapsiam* Inscription (CE 1007).**

The inscription was found at *Prāsād* (palatial building for gods) *Thapsiam*, *Aranyaprathet* District, *Prachīnburī* Province. It dates back to CE 1007 and bears the name of King *Sūryavarman*. The king is evidently *Sūryavarman I* who ruled Cambodia from CE 1002 to CE 1050 (Cœdès 1986:134). The inscription was edited and translated into Thai by *Cha-Em Kaewklai* (1986 Lem 4). It is almost identical with the inscription of *Phnom Sangke Kong* except for the addition of two more stanzas after the first two (See Cœdès 1954: 228-35). *Prāsād Thapsiam* is situated in *Tambol Khoksūng*, *Aranyaprathet* District, *Prāchīnburī* Province (Thabian Borānavatthu Sthān Thua Rāja Ānā Cakr 1973:368). It begins by Śiva being invoked and described as being the sole abode of Unmanā. Both of them are united as fire with flame. He (Śiva) is actually one. Nevertheless, he (Śiva) becomes many in the form of *ātman* in all living beings just as the moon appears on the moving waves (Kaewklai 1986 Lem 4: 55, verse I; Cœdès 1954: 229, verse I). The concept of one God of the *Upanisads* can be seen here. The Self (*ātman*) is described in the *Kathā Upaniṣad* thus: “That one (Supreme) ruler, the soul of all beings, who makes His one form manifold, to the wise who perceive him as abiding in the soul, to them is eternal bliss ___to no others.” (Radhakrishnan 1953: 640). Śiva is the light that glows in fire, earth, water, the sun, the wind, the moon and the sky (Kaewklai 1986 Lem 4, 55, verse II; Cœdès 1954: 229, verse II). A similar idea is found with regard to Brahman who is conceived in the *Maitrī Upaniṣad* as sparkling like the wheel of fire thus: “Then having pierced through what is thus enveloped one sees *Brahman* who sparkles like a wheel of fire, of the color of the sun, full of vigor, beyond darkness, that which shines in yonder sun, also in the moon, in the fire, in the lightning.” (Radhakrishnan 1953:834). Śiva, before giving the lustrous *Soma* juice to the gods to drink, is said to have drunk the inexhaustible power of the conqueror of the death who he has shown abiding in his own self (Kaewklai 1986 Lem 4, 55, verse III; Cœdès 1954: 234, verse III). It also records that *Smaravīravarmān*, *Dharaṇīndraparākrama*, *Vīravarmān* and *Nṛpendravallabha* have installed a *Śivaliṅga* (*ajeśaliṅga*) and one image each of *Śambhu* (Śiva) and *Devī* (*Pārvatī*) at the mountain designated as *Mṛt*, that is the earth, bestowed (on them) by the king of the mountain (1986 Lem 4, 56, verse IX-XIII; 1954: 230, verse VII-XI).

***Phimai* Inscription II (CE 1041).**

The inscription is fragmented and discovered at *Prāsād Hin Phimai*, *Phimai* District, *Nakhonrāthasima* Province. It is interesting that on one face of the in



scription the salutation is addressed to the Buddha, whereas on the other the salutation is to *Śiva* (Cœdès 1964: 124-6). *Śiva* is described here as one whose lotus feet deserved to be worshipped constantly by *Brahmā* and the other gods. He has one self-nature (*ekasvabhāva*). Nevertheless, he has all the forms of existence (*akhilabhāvamūrti*). He is of the state of void (*śunya*). Still he has several existences (*anekabhāva*). The inscription also eulogizes King *Sūryavarman* who is no doubt *Sūryavarman I*. It seems that during his reign Buddhism and Śaivism co-existed peacefully. In spite of the fact that he followed the *Devarāja* cult, his favor for Buddhism earned him the posthumous name *Nirvāṇapada* (Cœdès 1968: 135).

***Prāsād Phnomrung* Inscription (CE 1150)**

The inscription dates back to CE 1150 and was found at *Prāsād Phnomrung*, *Chalermphrakiat* District, *Buriram* Province, (H.R.H.Princess Mahachakri Sirindhorn 1978 : 139). *Śiva* is described here as having three eyes which are the sun, the moon and fire. He bears the daughter of Sage *Jahnu*, that is, *Gaṅgā*, on his head (1978 : 91, verse 21). *Narendrāditya*, who appears to be a ruler of a country which has its center at *Mahidharapura*, an unidentified locality, probably somewhere near *Prāsād Phnomrung*, is mentioned in the inscription. He is eulogized as identical with *Śiva* on earth, being one with *Viṣṇu* and *Brahmā* (1978:102, verse 32), having *Śiva*, *Brahmā*, *Viṣṇu*, and the moon as part of his body (1978: 109, verse 41) and as being identical with 8 forms (*mūrti*) which are the elements constituting *Śiva* (1978: 118, verse 48). It is mentioned in the inscription that he has burst open the *Brahmadvāra* from his practice of austerity at *Prāsād Phnomrung*. This may signify that he attained God-hood through the austerity. “The process of Yoga consists in rousing the radiant serpent and lifting it up from the lowest sphere to the heart, where in union with *prāṇa* or life-breath its universal nature is realized and from it to the top of the skull. It goes out through an opening called *brahmarandhra* to which corresponding in the cosmic organism the opening formed by the sun on the top of the vault of the sky” (Radhakrishnan 1953: 76). Most probably, the sect of *Śaivite* practiced at *Prāsād Phnomrung* was *Pāśupata* as indicated by the word *sthūlādripāśupata* used in stanza 65 which means *Pāśupata* of the great mountain (*Phnomrung*). Mention of the *Pāśupata* sect appears in the inscriptions of *Īśānavarman* at *Sombor- Prei Kuk* and that of *Bhavavarman II* at *Phnom Prah Vihar, Kampong Chnang* (Bhattacharya 1961: 43ff; Subhadradis 2004: 21ff; Cœdès 1937: 3-5). The sect of the *Pāśupatas*, devotees of *Paśupati* or *Śiva* arose a little later than the sect of the *Bhāgavatas*, worshippers of *Vāsudeva*, identified with *Kṛṣṇa* and *Viṣṇu*, which was active at least a century before Christ (Basham 1982: 331).



***Prāsād Sdok Kak Thom* Inscription (CE 1052)**

The inscription was found at *Prāsād Sdok Kak Thom* and dates back to CE 1052. It records the erection of a *liṅga* named *Śārvajayendravarmeśvara* by a *Brāhmaṇa* named *Sadāśiva* whose title is *Jayendrapañḍita* at the temple named *Bhadraniketana*, known at present as *Prāsād Sdok Kak Thom*, (Chakravarti 1980 : *Introduction*, XXI). *Prāsād Sdok Kak Thom* is situated in *Tambol Khoksūng*, *Tāphrayā* District, *Prāchīnburī* Province (Thabian Borānavatthu Sthān Thua Rāja Ānā Cakr 1973:370). It begins with an invocation to *Śiva*, who is described as the one whose real nature is *ātman* (Supreme Reality) which cannot be expressed in words but its existence can be inferred by the fact that it pervades the whole bodies of living beings and causes their sensual organs to function (Chakravarti 1980 : 1, verse II). He is further invoked to protect the whole universe with his three eyes which are the moon, the sun and fire. Those, who see the real nature of *ātman*, see him clearly in all respects (1980: 1, verse II). This inscription is a very important source of the cult of *Devarāja* in ancient Cambodia. The cult gradually developed when a *Brāhmaṇa* named *Hiraṇyadāma* who disclosed the mystery of *Devarāja* and taught to *Śivakaivalya* four texts embodied the doctrine of the cult, namely, *Vīṇāśikha*, *Sammohana*, *Śiraścheda* and *Nayottara*. King *Jayavarman II* and *Hiraṇyadāma* gave to the matrilineal family of *Śivakaivalya* the right to worship *Devarāja*. Seven generations of successors of *Śivakaivalya*, the kings they served, the property they acquired and the foundations they made in different parts of the country are described (1980 : *Introduction*, XIII). King *Jayavarman II*, the founder of the kingdom of Angkor, ruled Cambodia from CE 802-52. He started after returning from Java by establishing himself in the city of *Indrapura*. It was here, it seems, that the young king took into his services as royal chaplain, a *Brāhmaṇa* named *Śivakaivalya*, who was to follow him in all his changes of residence and to become the first chief priest of a new cult, that of the *Devarāja*, or “God-King” (Cœdès 1968: 95-8).

The Inscriptions in the Khmer language

The inscription of *Prāsād Hin Phnomvan 3* (CE 1182)

The inscriptions in the Khmer language that are related to Śaivism commonly record the gift of land, slaves, and other materials useful for temples by kings or by certain dignitaries to certain Brahmanic temples. Here is one example. The inscription of *Prāsād Hin Phnomvan 3*, dated CE 1182, is at one of the doors on the



western side of *Prāsād Wat Phnomvan*, Muang District, *Nakhonrāthasima* Province. It was edited by Prasān *Bunprakhong* and translated into Thai by *Thongsueb Suphamāk* (Cāruek Nai Pradeś Thai Lem 4 1986: 26-31). Beginning with the salutation in Sanskrit to *Śiva*, it records how the temple called *Devāśrama* is managed by caretakers appointed by King *Jayavarmadeva VII* who ruled Cambodia from CE 1181 - circa CE1218 (Cœdès 1968: 169).

Inscriptions in the Thai Language

The *Pū* (grandfather) *Khun Cit Khun Cot* inscription (CE1370)

The inscription which is in the Thai language belongs to *Sukhodaya* period and is related to the oath-taking by people of the ruling class of *Sukhodaya* Kingdom. *Śaivite* deities namely *Maheśvara*, *Sadāśiva*, *Ardhendasura* (*Ardhanārīśvara* ?), *Umā*, are cited among other deities to be the witnesses in the oath-taking ceremony (Prapandvidya 1996: 56). *Śaibāgama*, which is probably the sacred text of *Śaiva* sect, is also cited in the inscription to act as a witness bringing misfortune to anyone who breaks the oath (1996: 56).

The inscription in Thai on the base of a statue of *Śiva* (CE 1510)

The inscription records that *Phrayā Śrī Dharmāśokarāja* built a statue of *Śiva*, now in the National Museum, *Kampaengpet* Province, so that the god may protect the bipeds and the quadrupeds and he may also help to maintain the purity of the *Buddha sāsanā*, the *Sayya sāsanā*, and the *Phra Deva-karma* (1996: 56). Here we can see the syncretic nature of the belief in the period contemporaneous with the inscription from the fact that *Śiva* is invoked to protect *Buddhasāsanā*, that is, Buddhism, *Sayyasāsanā*, that is *Śaivism* and the unidentified form of religion called *Phra Deva-karma*.

Old literature on *Śaivism* in the early *Ayudhyā* Period

Lilit Onkār Chaeng Nām (cir. CE 1350)

One of the widely known pieces of Thai literature of *Ayudhyā* (Skt. *Ayodhyā*) period (CE1351-CE1767) is the Brahmanic ceremonial text entitled *Lilit Onkār Chaeng Nām*. Most probably it was composed when *Ayudhyā* was founded, that is, in CE 1351 (Bhumisak 1981: 7). The title can be broken up as follows: *Lilit* is a



type of poetry. The word probably corresponds to *lalita* in Sanskrit which means graceful, charming, or fine. *Oṅkāra* means here in Thai a “sacred text”, whereas in Sanskrit it means the sacred syllable *Om*. *Chaeng* means “consecration”, and *Nām* means “water”. The title of the text, therefore, probably means “The Graceful Poetic and Sacred Text for the Consecration of Water”. This text is to be recited by court *Brāhmaṇas* at the royal ritual to ensure the loyalty of the king’s servants who are required to drink the consecrated water. To consecrate the water, *Viṣṇu*, *Śiva* and *Brahmā*, are invoked respectively. After each invocation to *Viṣṇu*, *Śiva* and *Brahmā* the arrows named *Palaiivāt* (probably Skt.-*Pralayāstra*), *Agnivāt* (Skt.- *Agnyāstra*) and *Phrommāt* (Skt.- *Brahmāstra*) are to be dipped respectively by thrusting them in the water. Here *Śiva* is described as being *Parameśvara*, that is, the Supreme Lord, as residing at the Great Mountain, that is, *Kailāsa*, as riding on a white bull, that is, *Nandi*, as having a serpent as his sacred cord, as having a digit of the moon as the ornament on his matted hair, as keeping matted hair, as having three eyes, as wielding *vajra* as his weapon and as the one who destroys obstacles and visitations (See Prapandvidya 2004: 39-43; Vaṅṅakam Samay(a) Ayudhyā Lem 1 1997:7).

Lilit Yuan Phai (cir. CE 1529)

It is poetry eulogizing King *Boromtrailoknāth* (= *Paramatrayalokanātha*) of *Ayudhya* on the occasion of his victory over the northern Thai group. In spite of the fact that the king was a Buddhist he is described as being created by the Hindu Triad, *Brahmā*, *Viṣṇu* and *Īśvara* (*Śiva*), out of their compassion towards the people presumed to be those of Ayudhyā, by mixing the *aṣṭamūrti*, that is, the eight forms of *Śiva* (Vaṅṅakam Samay(a) Ayudhyā Lem 1 1997:331).

The king is also described as being the incarnation of *ekādaśadeva* which probably are the *Rudras*, the eleven forms of *Śiva* (1997: lo.cit.).

Concluding Remarks

1. From the reign of King *Bhavavarman I* till King *Jayavarman VII*’s accession to the throne, the major religion in the northeastern region of ancient Thailand was *Śaivism*. Buddhism, however, was allowed to be practiced as can be attested by its big center at *Phimai* Temple, *Phimai* District, *Nakhonratchasima* Province and by epigraphic, iconographic and architectural evidence.
2. So far, only one inscription belonging to *Vaisnavism* has been found at Prasad Khao Noi, Sra Kaew Province, in eastern Thailand. This shows that *Śaivism* was more prominent in this region, especially in northeastern Thailand.



3. No philosophical interpretations were given to *Śaivism* in the earlier inscriptions until the ninth century CE.
4. *Vedāntic* philosophy appears prominently in *Prāsād Thapsiam*, *Prāsād Phnomrung* and *Sdok Kak Thom* inscriptions.
5. During the reign of the last great king of ancient Cambodia, that is, King *Jayavarman VII*, *Śaivism* was still supported by the king in spite of the fact that he was a staunch Buddhist.
6. In *Sukhodaya* period, after the Sri Lankan form of Buddhism was adopted by King *Rāmklamhaeng* the Great, *Śaivism* seems to have lost its importance as evidenced by the few allusions to it in the Thai inscriptions.
7. Syncretism between Buddhism and Brahmanism existed even though both *Sukhodaya* and *Ayudhyā* kingdoms adopted *Theravāda* Buddhism as their state religion. Brahmanism still played an important role in state ceremonies such as the coronation, the oath-taking ceremony, the ceremony for the oath of allegiance by drinking consecrated water, etc.



Bibliography

- Amphai Khamtho, 1986. Charuek Ubmung (ed and trans). *In the Cāruēk Nai Pradeś*
 Basham AL, 1982. *The Wonder that was India*. Calcutta: Fontana Books.
- Bhattacharya, Kamaleswar, 1961. *Les Religions Brahmaniques dans l’Ancien
 Cambodge, d’Appès l’Épigraphie et l’Iconographie*. Paris: École Française d’
 Extrême-Orient.
- Cāruēk Nai Pradeś Thai Lem 1*, 1986. Bangkok: Ho Samut Haeng Chāt Krom
 Silpakorn.
- Cāruēk Nai Pradeś Thai Lem 4*, 1986. Bangkok: Ho Samut Haeng Chāt Krom
 Silpakorn.
- Chakravarti, Adhir, 1980. *The Sdok Kak Thom Inscription, part II*. Calcutta: Sanskrit
 College.
- Cham Thongkhamvan, 1986. Cāruēk Phaen Thong Daeng Ūthong (ed and trans). *In
 the cāruēk Nai Pradeś Thai Lem 1*. Bangkok: Ho Samut Haeng Chāt Krom
 Silpakorn.
- _____, 1986. Cāruēk Bo Īkā (ed). *In the Cāruēk Nai Pradeś Thai Lem 3*.
 Bangkok: Ho Samut Haeng Chāt Krom Silpakorn.
- Vaṇṇakam Samay(a) Ayudhyā Lem 1* 1997. Bangkok: Krom Silpakorn.
- Choosak Thipkesorn, 1986. Cāruēk Chong Sa Chaeng (ed and trans). *In the Cāruēk
 Nai Pradeś Thai Lem 1*. Bangkok: Ho Samut Haeng Chāt Krom Silpakorn.
- Chirapat Prapandvidya, 1996. Brahmanism and Buddhism As Recorded in the
 Inscriptions of Sukhothai Period 1826-2092 BE=1283-1549AD. *In The
 Proceedings of The International Seminar on Brahmanism and Buddhism in
 Thailand*. Bangkok: Phragru Vāmadevamunī.
- _____, 2004. “Buddhism In the Eastern and Northeastern Parts of
 Thailand from 7th to 13th Centuries Based on Inscriptions and Archaeological
 Evidence” in *Contribution of Buddhism to the World Culture, Vol.II* (ed
 Sankaranarayan, Kalpakam and others. Mumbai : Somaiya Publications Pvt.
 Ltd.
- _____, 2004. Iddhibol Khong Śāsanā Brāhm(an) Nai Pradeś Thai Cāk Lak
 Thān Thāng Cāruēk Lae Vaṇṇagadī Thai Bāng Suan. *In India Studies Journal,
 Thammasat University, Number 9, 2004*.
- _____, 2010. Religious Situation in Ancient Times (7th - 8th century) in the
 Eastern Part of Thailand as Revealed by Inscriptions. *In The ICCR International
 Seminar on “The Cultural & Historical Links between India and South East
 Asia*. Jakarta: Jawaharlal Nehru Indian Cultural Centre, Embassy of India.



- Chit Bhumisak, 1981. *Onkāṛ Chaeng Nām Lae Kho Khid Mai Nai Pravattiśāstr Thai Lum Nām Chao Phra Yā*. Bangkok: Duang Kamol Press Co. Ltd.
- Cœdès G, 1937. *Inscription du Cambodge Vol.I* (ed and trans Cœdès, G.). Paris: École Française d'Extrême-Orient.
- _____ 1942. *Inscription du Cambodge Vol.II* (ed and trans Cœdès, G.). Paris: École Française d'Extrême-Orient.
- _____ 1951. *Inscription du Cambodge Vol.III* (ed and trans Cœdès, G.). Paris: École Française d'Extrême-Orient.
- _____ 1954. *Inscription du Cambodge Vol.VI* (ed and trans Cœdès, G.). Paris: École Française d'Extrême-Orient.
- _____ 1964. *Inscription du Cambodge Vol.VII* (ed and trans Cœdès, G.). Paris: École Française d'Extrême-Orient.
- _____ 1968. *The Indianized States of Southeast Asia*, Edited by Walter F. Vella Translated by Susan Brown Cowing. Honolulu: East-West Center Press.
- _____ 1986. Cāruēk Śrīcānāśa (ed and trans) translated into Thai by Diskul, M.C.Subhadraśis. *In the Cāruēk Nai Pradeś Thai Lem 3*. Bangkok: Ho Samut Haeng Chāt Krom Silpakorn.
- Diskul, M.C.Subhadraśis, 2004. *Śāsanā Brāhm(an) Nai Ānācakr Khom*. Bangkok: Faculty of Archaeology, Silpakorn University.
- H.R.H. Princess Mahachakri Sirindhorn, 1978. *The Inscription found at Prāsād Bnam Rung*. Unpublished thesis submitted at Graduate School, Silpakorn University for the Degree of Master of Arts.
- Kaewkhilai, Cha-Em, 1986. Cāruēk Wat Sī Muang Aem; Cāruēk Pāk Maenām Mūl 1; Cāruēk Pāk Maenām Mūl 2; Cāruēk Wat Supat 1 (ed and trans). *In the Cāruēk Nai Pradeś Thai Lem 1*. Bangkok: Ho Samut Haeng Chāt Krom Silpakorn.
- _____ 1986. Cāruēk Prāsād Thapsiam (ed and trans). *In the Cāruēk Nai Pradeś Thai Lem 4*. Bangkok: Ho Samut Haeng Chāt Krom Silpakorn.
- Thai Lem 3*. Bangkok: Ho Samut Haeng Chāt Krom Silpakorn.
- Majumdar RC, 1963. *Ancient Indian Colonization in South-East Asia*. Baroda: Oriental Institute.
- Thabian Borānavatthu Sthān Thua Rāja Ānā Cakr 1973*. Bangkok: Krom Silpakorn.



Sentence Classifiers and Verb Phrase Classifiers¹

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Abstract

It is generally known that a classifier is designated by a noun dominating it. Some scholars consider it a semantic feature attached to a noun. Thai language scholars hardly pay attention to sentence classifiers and verb phrase classifiers in Thai. They are not mentioned in many Thai grammar books, including a booklet on classifiers issued by the Royal Institute of Thailand. There are several classifiers of time such as *khráŋ*, *hǒn*, *khraa*, *laa*, *thii*, *rǒp* and many others are employed as a sentence classifier for different actions of a noun or a verb phrase classifier of an abstract noun. Those who study Thai must learn how to use each word independently and separately in order to use it correctly.

Key words: classifier, semantic features

Introduction

Thai is one of the languages of the world that has classifiers. Classifiers are normally analyzed as features of a noun, for example *múj* ‘mosquito net’ [+cl] [+lǎŋ]. The structure of a noun phrase showing a classifier is as follows: a noun + a numeral + a classifier or a noun + [+cl] + *nèŋ* ‘one’ or *diaw* ‘one only’. Udom Warotamasikkhadit (1995, 2004) observes that classifiers do not only co-occur with noun but also co-occur with sentences and verb phrases. The first edition of a pamphlet on classifiers (1995) and the revised edition of a pamphlet on classifiers (2008) published by the Royal Institute of Thailand did not include sentence classifiers or verb phrase classifiers. This shows that Thai scholars show no interest in sentence classifiers and verb phrase classifiers.

¹ The early version of this paper was presented at the 42nd International Conference on Sino-Tibetan Languages and Linguistics at Payap University, Chiang Mai, Thailand, November 2-4, 2009.



1. Classification of sentence classifiers and verb phrase classifiers

There are 8 categories of sentence classifiers and verb phrase classifiers.

1.1 Classifiers meaning ‘time,’ for example: khráŋ ‘time’, khraa ‘time’, khraaw ‘time’, laa ‘time’ co-occurring with hòo to be used in an undulating shout or cheer in a procession for a wedding or ordination ceremony’, rǒɔp ‘going around in one circle’ or ‘showing the film from the beginning to the end’, talòp ‘round of fainting’, thii ‘time’, thîaw ‘time’, hǒn ‘time’, yòk ‘a round of a boxing match’, thǒɔt or tòɔ ‘a transfer or a connection from one bus or a passenger boat to another.’

a. yaam tii rakhaŋ hâa khráŋ
guard beat bell 5 time

‘the guard rang the bell five times.’

b. khǎw kràap ɲaam ɲaam sǎam khraa
he prostrate grace grace three time.

‘He prostrated with the palms pressed together and the hands resting on the floor; the forehead rests against the hands gracefully three times.’

c. phǒm sòŋ sǐnkháa maa hây khun sǎam khraaw pen
I send goods come give you three time be
ɲən sǎam phan bát
money three thousand baht

‘I sent goods to you three times totaling three thousands baht.’

d. chaay khon nán hòo sǎam laa kòɔn khâw pay nay bân
man cl. that give cheer three time before enter go in house

‘That man gave three long undulating cheers before entering the house.’

e. pâa pen lom pay lǎay talòp
aunt faint go many time

‘Auntie fainted many times.’

f. khruu tii phǒm sǒɔŋ thii dūay máy banthát
teacher beat I two time with ruler

‘Teacher beat me twice with a ruler.’

g. chûa cèt thii dii cèt hǒn
evil seven time good seven time

‘There have been seven times of bad luck, (there will be) seven times of good luck.’

h. yâak rǒy hǒn con phan khraaw
difficulty hundred time poverty thousand time



‘A hundred times of difficulty and a thousand times of poverty. (we will endure).’

- i. khǎw khàp rôt won sǎam rǒp
he drive car circle three time
‘He drove his car in a circle three times’
- j. khǎw ʔàan nǎŋʂH lêm nán sǎam thǎaw
he read book cl. that three time.
‘He read that book three times.’
- k. nákmuay khûu ní chók kan síp yók
boxer pair this fight each other ten round
‘The two boxers enter a ten round match.’
- l. phǒm nâŋ rôtmee sǎam tǒo kwàa ca thǎŋ plaay thaan
I sit bus three transfer till will reach end way
It took me three transfers on the bus to reach the destination.’
- m. thəə nɔɔn thɔɔt diaw yan sawàan
she sleep lie one till dawn
‘She sleeps straight through without interruption until morning.’

1.2 Classifiers showing unit of time, such as wínaathii ‘second’, naathii ‘minute’, chûamooŋ ‘hour’, wan ‘day’, ween² ‘day’, khɪn ‘night’, sàpdaa ‘week’, ʔaathít ‘week’, dian ‘month’, pii ‘year’, phansǎa ‘year’ (royal language), thótsawát, ‘decade’, sàtàwát ‘century’

- a. ləp taa síp wínaathii
close eye ten second
‘Close your eyes for ten seconds.’
- b. khǎw ʔǒk pay dâay síp naathii léæw
he leave go can ten minute finish
‘He left ten minutes ago.’
- c. khun ca yùu thǎi ní kǐi chûamooŋ
you will be place this how many hour
‘How long will you be here?’
- d. khǎw phák kàp raw sǒŋ wan
he stay with us two day.
‘He stays with us two days’.

² Found in *The Royal Chronicle R.E. 120*. p. 72, with the spelling ๑๗๕, but ๑๗๖ in the other places meaning ‘day’



- e. raw pay kháṅ nay pàa nṅ khṅ
we go sleep in forest one night.
'We slept in the forest one night.'
- f. tháp lǎṅ rṅnræm yī sṅp hâa ween
army royal travel two ten five day
'The Royal Army traveled 25 days'
- g. mǎæ ca pay ʔameerikaa nṅ sàpdaa
mother will go America one week.
'Mother will go to America for a week.'
- h. phṅ ca pay bâannṅk nṅ ʔaathít
father will go upcountry one week
'Father will go upcountry one week.'
- i. phṅm ca mây yùu bâan tháj đian
I will not be home whole month
'I will not be home the whole month.'
- j. khǎw càak bâan pay hâa pii
he leave home go five year
'He left home five years ago.'
- k. sṅmḍèt phrá nareesṅan sawǎy râtchásṅmbàt sṅphòk phansǎa
King Naresuan reign throne sixteen year
King Naresuan reigned for sixteen years.'
- l. phrá ʔṅ ní bùat maa hâa phansǎa
monk cl. this ordain come five year
'This monk has been ordained for five years.'
- m. kwaam sǎmphān thay-ciin mii maa kṅn nṅ sàtawát
relationship Thai-Chinese have come more one century
'The Thai-Chinese relationship has been established for more than one century.'

1.3. Classifiers showing a unit of linear measurement, such as kràbiat 'one fourth of an inch', khṅp 'a span from the tip of a thumb to the tip of the middle finger', krìak 'a span from the tip of the thumb to the tip of the forefinger or half a meter', níw 'inch', sṅk 'the distance from the tip of the middle finger to the elbow joint or half a meter', waa 'two meters', lǎa 'yard', mét 'meter', sṅ '40 meters', kiloomét 'kilometer', may 'mile', yṅt, '400 sṅ or 16,000 meters.'



- a. máay phæn níi nǎa sǎw kràbiat
plank cl. this thick two one fourth of an inch
'This plank is half an inch thick.'
- b. raw tôṅ cháý phâa kwâaṅ sǎw khâp³
we must use cloth wide two a span from the tip of the thumb to the tip
of the forefinger'
'We need a piece of cloth about a meter wide'
- c. sǎw tôn níi sũuṅ sîp sòk
pole cl. this tall ten half a meter
'This pole is five meters tall.'
- d. sũan khànàt níi yaaw sîi sên
fruit farm cl. this long four 40 meters
'This fruit farm is 160 meters long.'
- e. khǎw dǎon thaṅ lǎay m̀m yòt
he travel many 10,000 yòt
'He travels a long distance.'
- f. phǎm s̄i phâa maa ỳi:sìpkhâaw lǎa
I buy cloth come twenty-nine yard
'I bought twenty-nine yards of cloth.'
- i. khǎw w̄iṅ s̄iphâa may
he run fifteen mile
'He ran fifteen miles.'

1.4 Classifiers showing a monetary unit, such as bàat 'baht', sàlĩṅ 'a quarter of one baht', tamlṅ 'four baht', ch̄aṅ '80 baht' r̄ian 'dollar', ruupii 'rupee', yeen 'yen', p̄on 'pound'

- a. wan níi khun cháý ṅaṅ pay k̄i r̄ian
day this you spend money go how many dollar
'Today how many dollars did you spend?'
- b. khâa ch̄aw bâan khǎw đian lá phan p̄on
cost rent house he month one thousand pound
'His rent is 1,000 pounds a month.'
- c. khǎw đ̄ay ṅ̄and̄ian đian lá lán yeen
he get salary month one million yen
'He receives a salary of a million yen a month.'

³ One khâp is .025 meter



- d. khǎw mii ηən phiaη hòk sàlǎη
he has money only six a quarter of one baht
'He has only 1.50 baht'
- e. mǎæ ráp ηən pay sii tamliη
mother receive money go four four baht
'Mother received 16 baht.'
- f. khâadooysǎan rótraη sîp ruupii
fare tram ten rupee
'The tram fare is ten rupee.'

1.5 Classifiers showing unit of weight such as hǔn 'a Chinese unit of weight used by jewelers, equal to 375 mg.', sàlǎη 'unit of weight for silver or gold, equal to 3.75 gm.', bàat 'unit of weight for silver or gold, equal to 15 gm.', tamliη 'unit of weight for silver or gold, equal to 60 gm.', chǎη '600 gm.', hàap 'unit of weight equal to 60 kg.', kram 'gram', kilookram 'kilogram', ʔɔɔn 'ounce', pɔɔn 'pound', tan 'ton equal to 1,000 kg.'

- a. thɔɔη phǎen níi nàk sii hǔn
gold piece this weigh four 375 mg.
'This piece of gold weighs 1.5 gm.'
- c. sɔɔy thɔɔη níi nàk nǎη bàat
chain gold this weigh one 15 gm.
'This gold chain weighs 15 gm.'
- d. phǎm khǎɔ sǎi náamtaan sɔɔη kilookram
I request buy sugar two kg.
'I want to buy two kilograms of sugar.'
- e. tua khǎw mii náamnàk róɔy pɔɔn
body he have weight hundred pound
'He weighs one hundred pounds.'

1.6 Classifiers showing volume such as thanaan 'one liter', thǎη or sàt '20 liters', kwian '2,000 liters', lít 'liter', sii sii 'c.c.' kǎænlon 'gallon'

- a. nóɔη hǔη khǎaw sɔɔη thanaan sǎmràp (khon) hòk khon
sister boil rice two liter for (man) six person
'Sister boiled two liters of rice for six persons.'



- b. náamplaa khùat níi bancù cèt róy hâa sîp sii sii
fish sauce bottle this contain seven hundred five ten c.c.
'This bottle of fish sauce contains 750 c.c.'
- c. khun khuan ðim náam wan lá sǎy lít
you should drink water day one two liter
'You should drink two liters of water a day.'
- d. Máyúrii kîaw khâaw dâay róy kwian
Mayuree harvest rice get hundred kwian
'Mayuree harvested 100 kwian of rice.'
- e. rót khan níi kin náamman wan lá sîp kæænlǎn
car cl. this eat gasoline day one ten gallon
'This car consumes 10 gallons of gasoline a day.'

1.7 Noss (1964:109) noticed imitative classifiers in Thai such as pang 'bang', pŕiay 'a crash of thunder', khroom 'the sound of heavy objects crashing to the ground or the floor', tuum 'boom', plææp 'a flash of lightning', ?ûu 'the sound of a strong wind blowing', fíaw 'the sound of bullets going through the air', bîm 'the sound of a bomb explosion'

- a. raw dâyyin sǎy pŕn daŕ lǎy pang
we hear sound gun loud many bang
'We heard many loud bangs of the guns.'
- b. fáa phâa loŕ maa sǎam pŕiay
sky split down come three time
'Thunderbolts struck three times.'
- c. khǎw yoon nǎŕsŕi maa khroom diaw yîi-sîp lêm
he throw book come sound of heavy objects one twenty cl.
'He threw 20 books down on the floor together at one time.'
- d. rábèetmŕi daŕ khîn sǎam tuum.
bomb hand loud up three boom
'Three loud booms of hand grenade explosions were heard.'
- e. fáa lêp sǎy sǎam plæp kǎn fǎn tòk
sky flash two three flash before rain fall
'Lightning flashed two or three times before it started raining.'
- f. sǎy rábèet daŕ lǎy bîm
sound bomb loud many cl.
'Many explosions were heard.'



- g. phaayú maa lǎŋ lom phát rææŋ sǎam sǐi ʔúu
storm come after wind blow strong three four time
'The storm came after the sound of a strong wind blowing 3-4 times.'
- h. kràsũn daŋ phaàn ʔaakàat khâam hûa pay pen róoy róoy
bullet loud through air over head go be hundred hundred
fíaw
time
'Bullets were heard many hundreds of times going through the air over our heads.'

1.8 Miscellaneous classifiers for different sentence or verb phrases

- a. thəə lǎp pay sǎam tɨn⁴ sǎamii yaŋ mây klàp bâan
she asleep go three awakening husband still not return home
'She was asleep and woke up three times, but her husband did not return home.'
- b. thǎŋ khûu yâaŋ sǎam khũm khâw hǎa kan
all both walk three step toward meet each other
'Both step forwards toward each other triumphantly.'
- c. phǒm tŏŋ kǎæ bon cèt wát cèt waa
I must pay vow seven temple seven monastery
'I must pay a vow to fulfill my promise at seven temples.'
- d. raw tŏŋ phaay lǎy câm háy pay thŏŋ fâak nŏon
we must paddle many quick stroke let go to bank opposite
'We must paddle with many quick strokes to reach the opposite side.'
- e. khun thǒoy lǎŋ pay nŏŋ kâaw
you move back go one step
'You move back one step.'
- f. pɨn yây yŏŋ sàlùt yŏi sŏp ʔèt nát
cannon big fire salute twenty one shot
'The cannons fire twenty one shots for a salute.'
- g. khǎw tham hâa tâæm⁵ tham hây raw plŏoy sǎa nâa
he make five faux pas make let we follow suit loose face
'He commits a faux pas and make us loose face.'

⁴ It is strange to find that a classifier of being asleep is the verb meaning 'waken.'

⁵ The literal meaning of hâa tâæm is five points but it is an idiom meaning 'to commit a faux pas.'



- h. raw kamlaj pay kin sîi thûay⁶ bâan kamnan
 we now go eat four bowl house elder headman
 ‘We are going to have a feast at the elder headman’s house.’

2. Conclusion

The sentences above certainly show that sentences and verb phrases can take classifiers. Professor Prasert Na Nagara considers that sentences or verb phrases can function as abstract nouns in Thai and they can contain classifiers like other nouns. Thus it is normal for those learning Thai to memorize specific classifiers for certain nouns, sentences and verb phrases.

References

- Apiluck Tumtavikul, Chirapha Niwataphant, Philipp Dill, 2009. ‘Classifiers in Thai Sign Language’. *Festschrift in Linguistics, Applied Linguistics, Language and Literature in Honor of Professor Dr. Udom Warotamasikhhadit on his 75th Birthday*. Bangkok, Suan Sunandha Rajabhat University Press.,pp 255-275.
- Department of General Education, 2007. *The Royal Chronicle of R.E. 120*. Second Printing. Bangkok, Matichon.
- Noss, Richard B, 1964. *Thai Reference Grammar*. Washington, DC, Foreign Service Institute.
- Somsongse Burusphat, Zhou Guoyan, 2009. *A Comparison of Classifiers in Tai-Kadai Languages*. Nakhon Pathom, Language and Culture Institute for Rural Development, Mahidol University.
- The Royal Institute of Thailand, 2003. *Classifiers*. Revised edition. Bangkok, Sahamit Printing.
- The Royal Institute of Thailand, 2008. *Classifiers*. Seventh printing. Bangkok, Idea Square Partnership.

⁶ Traditional Thai desserts are of four kinds consisting of น้ำกะทิ ‘sweetened coconut cream mixed with palm sugar or coconut sugar’ in the center bowl of the tray, and four other bowls containing: one bowl of ไข่กบ ‘frog eggs’ which are ‘cooked tapioca, or water soaked mint seeds’, one bowl of นกปรดอย free birds’ or ‘ลอดของ which are sweetmeats similar to light green noodle’, one bowl of มะลิลอย ‘floating jasmynes’ which are ‘popped rice’, and one bowl of ข้าวคั่ว ‘dark or white cooked sticky rice’ which were popular dessert in the old day.



Udom Warotamasikkhadit, 1995. *Thai Grammar in Linguistics*. First Edition. Bangkok, Ramkhamhaeng University Press.
_____, 2004. *Thai Grammar in Linguistics*. Third Edition. Bangkok, Ramkhamhaeng University Press.



An Evaluation of Viscosity Models for the Prediction of the Two-phase Pressure Drop in Two-phase Flow through a Circular Micro-channel

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Abstract

Adiabatic two-phase air-water flow experiments are conducted in this study. A fused silica channel, 120 mm long, with a diameter of 0.22 mm is used as the test section. The void fraction data obtained by image analysis correspond with the Amand-type correlation. The experimental frictional pressure drop data are compared with the homogeneous flow predictions. Several well-known two-phase viscosity models are evaluated in order to address the appropriate methods among them for application to micro-channels.

Key words: two-phase flow, micro-channel, void fraction, pressure drop

1. Introduction

Two-phase flow in micro-channel flow passages has been studied over the years. The clarifications of micro-scale effects on two-phase flow and heat transfer characteristics have become more necessary due to the rapid development of microstructure devices used for several engineering applications including medical devices, high heat-flux compact heat exchangers, and cooling systems of various types of equipment such as high performance micro-electronics, supercomputers, and high-powered lasers.

Several investigators have proposed criteria to address the definition of a micro-channel. The proposed channel classifications are often based on different



dimensionless parameters. For instance, arbitrary channel classifications based on the hydraulic diameter D_h have been proposed. Mehendale et al. (2000) employed the hydraulic diameter as an important parameter for defining heat exchangers and Kandlikar (2002) proposed criteria for small flow channels used in engineering applications.

Two-phase flow and heat transfer characteristics in small channels such as micro-channels and mini-channels are likely to be strongly dependent on surface tension effects in addition to viscosity and inertia forces, resulting in significant differences in two-phase flow phenomena between ordinary sized channels and small channels.

In the past decade, there has been a relatively small amount of publications available for both mini-channels and micro-channels compared to those for ordinary sized channels.

Triplett et al. (1999a, 1999b) studied adiabatic two-phase air-deionized water (DI water) flow characteristics in micro-channels with hydraulic diameter ranging from 1.1 to 1.5 mm. The flow patterns observed were bubbly, slug, churn, slug-annular and annular. The measured void fraction and two-phase pressure drop in the relevant flow regimes were also investigated. The void fraction data were obtained based on the image analysis.

Serizawa et al. (2002) investigated the visualization of the two-phase flow pattern in circular micro-channels. The flowing mixture of air and water in channels of 20, 25 and 100 μm in diameter and that of steam and water in a channel of 50 μm in diameter were conducted experimentally. Two-phase flow patterns obtained from both air-water and steam-water flows were quite similar and their detailed structures were described. The study confirmed that the surface wettability had a significant effect on the two-phase flow patterns in very small channels.

Chung and Kawaji (2004) performed an experiment in order to distinguish two-phase flow characteristics in micro-channels from those in mini-channels. Four different circular diameters ranging from 50 to 526 μm were employed, to examine a scaling effect on nitrogen-DI water two-phase flow. The results including the flow patterns, void fraction and two-phase pressure drop were analyzed.

A flow visualization study to clarify the flow patterns of a vertical upward gas-liquid two-phase flow in rectangular mini-channels with hydraulic diameters ranging from 1.95 to 5.58 mm was carried out by Satitchaichoen and Wongwises (2004). Air-water, air-20 wt.% glycerol solution, and air-40 wt.% glycerol solution were used as working fluids. In the experiments, they employed various rectangular



test sections: 20 mm x 2 mm, 40 mm x 1 mm, 40 mm x 2 mm, 40 mm x 3 mm and 60 mm x 2 mm at an equal length of 1 m. The flow phenomena, which were classified as bubbly flow, cap-bubbly flow, slug flow, churn flow and annular flow, were observed and recorded by a high-speed camera. The effects of gap size, channel width and liquid viscosity on the flow pattern transitions were also discussed.

Saisorn and Wongwises (2008) reported the influence of the working fluid on flow characteristics in a 0.53 mm diameter channel. Air, nitrogen gas, water and de-ionized water were used as working fluids. The results of the two-phase air-water system were found to agree with those of working fluids other than air-water mixture. A new correlation was also developed based on their experimental data.

From the above review of the literature, the two-phase flow phenomena in micro-channels are not entirely consistent with those in ordinary sized channels. However, some experimental data for micro-channels showed fair agreement with predictions developed based on ordinary sized channels. In general, the prediction methods derived from the separated flow assumption were considered to compare with the data, whereas the homogeneous flow assumption seemed to be unattractive for previous researchers. This is possibly due to the fact that the observed flow patterns are much less homogeneous under different conditions. Interestingly, it should be noted from Chung and Kawaji (2002) and Saisorn and Wongwises (2008) that although their observed flow patterns were not perfectly homogeneous, the measured void fractions for channels with diameters larger than 0.1 mm were found to vary linearly with volumetric qualities. Such a linear relationship between the void fraction and volumetric quality indicates that two-phase flow behavior is not far from the homogeneous flow assumption. The current work is, therefore, aimed at examining the applicability of several widely used viscosity models to the pressure drop prediction of air-water flow through a 0.22 mm diameter channel.

2. Experimental apparatus and procedure

The experiments dealing with pressure drop measurements were carried out using the apparatus along with the instruments shown in Fig. 1. Air and water are used as working fluids in the system. Instead of a conventional pump, which may contribute to pulsation and fluid contamination, air and the liquid-filled tank are combined and operated as a pneumatic pump to supply a constant flow rate of liquid through the test section. The mixing chamber is designed to introduce the air-water mixture smoothly along the channel. The mixture flows freely from the channel outlet where atmospheric pressure is realized. The gas flow rates were able to be

measured by four sets of rotameters within the range of 5-50 sccm, 0.05-0.5, 0.2-2.0, 1-10 SCFH, respectively. For liquid flow rate measurements, an electronic balance (320 ± 0.001 g) was used to measure the weight of the liquid flowing freely from the outlet over a period of time. The test section used in this work is a fused silica channel with a diameter of 0.22 mm and a length of 120 mm. The single-phase and two-phase pressure drops across the test section were determined by two pressure transducers installed at the channel inlet. The low range pressure transducer was calibrated from 0 to 250 kPa with a ± 0.5 kPa accuracy and the high range one was calibrated from 0 to 1000 kPa with a ± 2 kPa accuracy. Type T thermocouples were used to measure fluid temperatures. The degree of uncertainty of the temperature measurements was $\pm 0.1^\circ\text{C}$.

The single-phase flow experiments with different fluids were the first to be performed. Following this, the two-phase flow experiments were conducted at various gas and liquid flow rates. In this work, the gas flow rate was increased by small increments, while the liquid flow rate was kept constant at a pre-selected value. The system was allowed to approach steady conditions before the fluid flow rates, flow patterns and pressure drops were recorded.

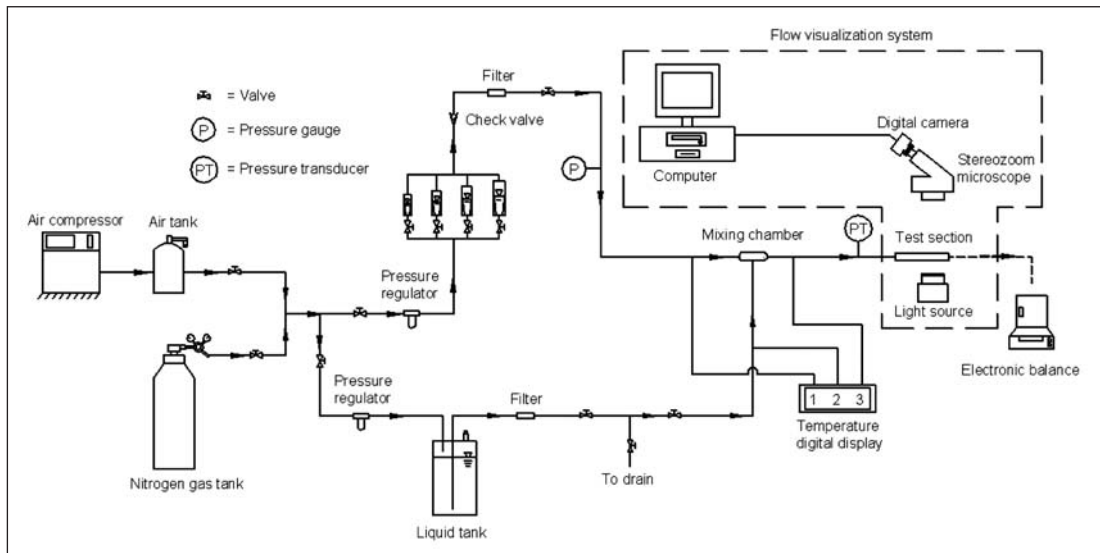


Figure 1 Schematic diagram of test facility.



3. Results and discussion

3.1. Void fraction

Void fraction is the fraction of channel cross-sectional volume that is occupied by the gas phase. This void fraction is one of the most important parameters used to evaluate the pressure drop components existing in two-phase flow in various channels. In the case of a horizontal channel, for instance, the void fraction is required before calculating the accelerational pressure drop.

For channels with hydraulic diameters of less than 1 mm, it may be convenient to estimate void fraction by image analysis. Regarding the flow patterns, observed from the presented channel, which are throat-annular flow, annular flow and annular-rivulet flow, the void fraction is the average value estimated from around 50-70 photographed images. The image analysis is considered by assuming symmetrical volumes, covering spherical and ellipsoidal segments as well as cylinders, formed by the gas-liquid interface. The volumetric void fraction was determined, based on the micrometer scale with an accuracy of ± 0.05 mm.

The void fraction data were found to agree well with the Armand-type correlation of Eq. (1) recommended for small channels.

$$\alpha = 0.833\beta \quad (1)$$

where α represents volumetric void fraction and β stands for volumetric quality.

The linear void fraction distribution was also reported by Saisorn and Wongwises (2008) but their data corresponding to a 0.53 mm diameter channel are very compatible with the homogeneous flow model ($\alpha = \beta$). Their void fraction values are slightly larger than the ones presented. Such deviations are due to the fact that for a larger diameter, a highly deformed gas-liquid interface is observed and hence the gas volume is decelerated through the liquid, resulting in the increment of residence time for gas volume in the field of view. The appearance of the gas volume with higher residence time indicates the relative high void fraction.

Although the data presented do not correspond well with the homogeneous flow model, the void fraction still varies linearly with volumetric quality. This implies that the slip ratio is not very large and that the pressure drop data may possibly be predicted by the methods developed from the homogeneous flow assumption. Several widely used viscosity models will be examined in the next section.



3.2 Frictional pressure drop

Prior to obtaining data for the two-phase frictional pressure drop, measurements of the total pressure drop are taken under various sets of different conditions. In this work, the total pressure drop of two-phase flow in a horizontal channel is composed of three terms: frictional pressure drop, accelerational pressure drop and pressure drop caused by the abrupt flow area. The latter component can be evaluated from an empirical correlation proposed by Abdelall et al. (2005). By subtracting the accelerational term and sudden contraction component from the total pressure drop, the frictional pressure drop data were obtained. Further details regarding the calculation method are available in Saisorn and Wongwises (2009). The frictional pressure drop data obtained are subsequently compared with the homogeneous flow predictions, taking into account several existing viscosity models.

The homogeneous flow model assumes that gas and liquid phases flow with equal velocity. The gas-liquid mixture is considered as a single-phase flowing with average fluid properties.

For pressure drop calculations based on the homogeneous flow, it follows that

$$-\frac{dP_f}{dz} = \frac{f_{TP} G^2}{2D\rho_H} \quad (2)$$

$$\rho_H = \left[\frac{x}{\rho_G} + \frac{(1-x)}{\rho_L} \right]^{-1} \quad (3)$$

In Eqs. (2) and (3), $(-dP_f/dz)$ is the two-phase frictional pressure gradient, G is mass flux, D is the channel diameter, x is mass quality, ρ_H is the average density of the homogeneous fluid, and ρ_L and ρ_G are liquid and gas densities, respectively. f_{TP} shown in Eq. (2) represents the two-phase Darcy friction factor which is a function of the two-phase Reynolds number:

$$Re_{TP} = \frac{GD}{\mu_{TP}} \quad (4)$$

For laminar flow ($Re_{TP} \leq 2100$),

$$f_{TP} = \frac{64}{Re_{TP}} \quad (5)$$



For turbulent flow ($Re_{TP} < 100,000$) in a smooth channel,

$$f_{TP} = \frac{0.3164}{Re_{TP}^{0.25}} \quad (6)$$

where μ_{TP} presented in Eq. (4) is two-phase viscosity. Several two-phase viscosity models proposed by different researchers are given in Eqs. (7) – (11).

McAdams et al. model (1942):

$$\frac{1}{\mu_{TP}} = \frac{x}{\mu_G} + \frac{(1-x)}{\mu_L} \quad (7)$$

Lin et al. model (1991):

$$\mu_{TP} = \frac{\mu_L \mu_G}{\mu_G + x^{1.4}(\mu_L - \mu_G)} \quad (8)$$

Cicchitti et al. model (1960):

$$\mu_{TP} = x\mu_G + (1-x)\mu_L \quad (9)$$

Dukler et al. model (1964):

$$\mu_{TP} = \beta\mu_G + (1-\beta)\mu_L \quad (10)$$

Beattie and Whalley model (1982):

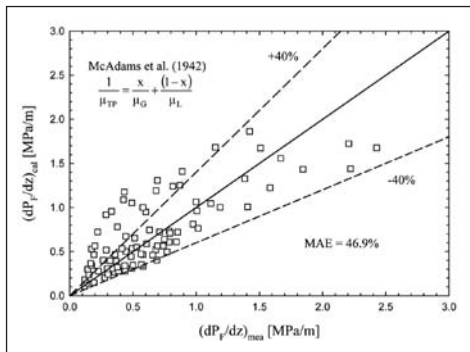
$$\mu_{TP} = \beta\mu_G + (1-\beta)(1+2.5\beta)\mu_L \quad (11)$$

In the above equations, β is volumetric quality, and μ_G and μ_L represent gas and liquid viscosities, respectively.

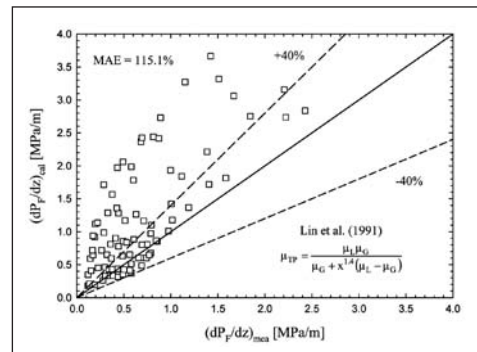
The frictional pressure drop data are compared with the predictions with different viscosity models as presented in Figs. 2-6 which contain the mean absolute error (MAE) providing the predictive accuracy of the corresponding models. In general, the agreement between the predictions and the data presented is not good.

Only methods proposed by McAdams et al. (1942) and Beattie and Whalley (1982) were found to be roughly predictable. The comparisons illustrate that the viscosity model developed by McAdams et al. (1942) gives the best prediction, with MAE of 46.9% and 67.1% of the predicted data falling within a $\pm 40\%$ error band. With MAE of 44%, the method of Beattie and Whalley (1982), the second best prediction, captures 29.4% of the data within a $\pm 40\%$ error band.

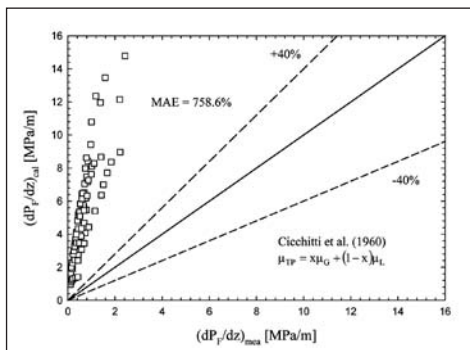
As seen from the models shown in Eqs. (7) - (11), mass quality or volumetric quality is an important parameter in determining the two-phase viscosity. The models taking into account the mass quality tend to over-predict the data as illustrated in Figs. 3 and 4. As presented in Figs. 5 and 6, on the contrary, the models based on volumetric quality give under-prediction in comparison to the experimental results.


Figure 2

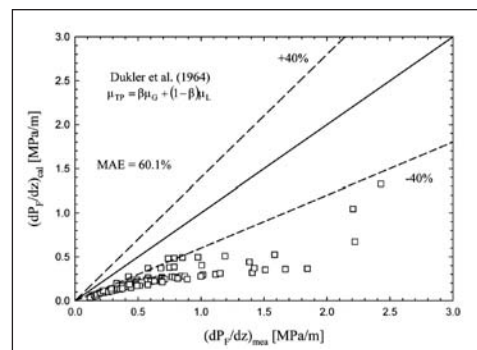
Experimental data vs. predicted pressure drop with McAdams et al. model [11].


Figure 3

Experimental data vs. predicted pressure drop with Lin et al. model [12].


Figure 4

Experimental data vs. predicted pressure drop with Cicchitti et al. model [13].


Figure 5

Experimental data vs. predicted pressure drop with Dukler et al. model [14].

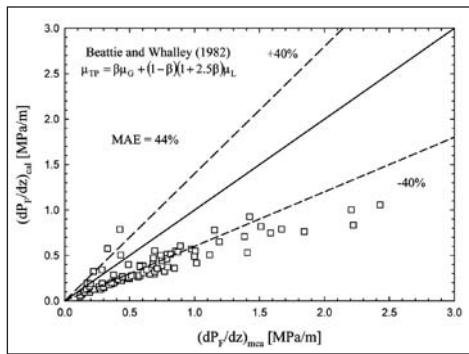


Figure 6

Experimental data vs. predicted pressure drop with Beattie and Whalley model [15].

4. Conclusion

Two-phase air-water flow is carried out in a channel with a diameter of 0.22 mm which is made of fused silica. Void fraction data are obtained based on image analysis. The void fraction is in a linear relationship with volumetric quality. The two-phase frictional pressure drop data are obtained by subtracting the accelerational term and the sudden contraction component from the total pressure drop. The capability of several well-known two-phase viscosity models for predicting pressure drop in the present channel is analyzed by comparing their predictions with experimental results.

Acknowledgements

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References

- Abdelall FF, Hahn G, Ghiaasiaan SM, Abdel-Khalik SI, Jeter SS, Yoda M, Sadowski DL, 2005. Pressure drop caused by abrupt flow area changes in small Channels. *Exp. Therm. Fluid Sci*, 29: 425-434.
- Beattie DRH, Whalley PB, 1982. A simple two-phase flow frictional pressure drop calculation method. *Int. J. Multiphase Flow*, 8: 83-87.
- Chung PM-Y, Kawaji M, 2004. The effect of channel diameter on adiabatic two-phase flow characteristics in microchannels. *Int. J. Multiphase Flow*, 30: 735-761.
- Cicchitti A, Lombardi C, Silvestri M, Soldaini G, Zavalluilli R, 1990. Two-phase cooling experiments-Pressure drop, heat transfer and burnout measurement. *Energ. Nucl*, 7: 407-425.



- Dukler AE, Wicks M III, Cleveland RG, 1964. Pressure drop and hold-up in two-phase flow. *AIChE J*, 10: 38-51.
- Kandlikar SG, 2002. Fundamental issues related to flow boiling in mini-channels and micro-channels. *Exp. Therm. Fluid Sci*, 26: 389-407.
- Lin S, Kwok CCK, Li RY, Chen ZH, Chen ZY, 1991. Local frictional pressure drop during vaporization for R-22 through capillary tubes. *Int. J. Multiphase Flow*, 17: 95-102.
- McAdams WH, Woods WK, Heroman LC, 1942. Vaporization inside horizontal tubes-III. Benzene-Oil Mixtures. *Trans. ASME*, 64: 193.
- Mehendale SS, Jacobi AM, Ahah RK, 2000. Fluid flow and heat transfer at micro- and meso-scales with application to heat exchanger design. *Appl. Mech. Rev*, 53: 175-193.
- Saisorn S, Wongwises S, 2008. Flow pattern, void fraction and pressure drop of two-phase air-water flow in a horizontal circular micro-channel. *Exp. Therm. Fluid Sci*, 32: 748-760.
- Saisorn S, Wongwises S, 2009. An experimental investigation of two-phase air-water flow through a horizontal circular micro-channel. *Exp. Therm. Fluid Sci*, 33: 306-315.
- Satitchaicharoen P, Wongwises S, 2004. Two-phase flow pattern maps for vertical upward gas-liquid flow in mini-gap channels. *Int. J. Multiphase Flow*, 30: 225-236.
- Serizawa A, Feng Z, Kawara Z, 2002. Two-phase flow in micro-channels. *Exp. Therm. Fluid Sci*, 26: 703-714.
- Triplett KA, Ghiaasiaan SM, Abdel-Khalik SI, Sadowski, Sadowski DL, 1999. Gas-liquid two-phase flow in microchannels Part I: two-phase flow patterns. *Int. J. Multiphase Flow*, 25: 377-394.
- Triplett KA, Ghiaasiaan SM, Abdel-Khalik SI, LeMouel A, McCord BN, 1999. Gas-liquid two-phase flow in microchannels Part II: void fraction and pressure Drop. *Int. J. Multiphase Flow*, 25: 395-410.



Improved Palatability of High Plant Protein Shrimp Feed by the Addition of Betaine/Amino Acid Mixture

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Abstract

Betaine or trimethylglycine functions as a methyl group donor. Sugar beet is the natural source of betaine. A commercial aquafeed additive using betaine as a main source is produced by the trade name of Finnstim. Other amino acids inclusions are glycine, alanine, isoleucine, leucine and valine. The composition is proprietary and is said to be the result of empirical experimentation. The role of Finnstim as a fish feed attractant was very well documented. However, further studies are needed to test its effectiveness as a feed attractant in shrimps.

The current paper studied the role of Finnstim in improving palatability of high plant protein shrimp feed. Three levels of Finnstim, i.e. 0%, 0.75% and 1.5%, were tested using two basal feeds. One was a generalized Thai shrimp feed comprised mostly of animal protein and another was a high plant protein feed. This made a total of 6 treatment diets. The experimental feeding trials were conducted with juvenile *Penaeus monodon* in 3 replications for 8 weeks.

The proximate analysis of the six treatment diets revealed that protein content in plant protein diets were approximately 3% lower than in the animal protein diets. Addition of Finnstim resulted in a 1-2% increase of protein in the basal diets depending on the amount added. This evidence showed that Finnstim protein was quite concentrated. Covariance analysis showed significant differences between the growth slopes of the six treatments. However, the growth slopes of the plant protein diet +1.5% Finnstim and the basal animal protein diet did not differ significantly. Addition of 1.5% Finnstim to the plant protein diet significantly improved the food conversion ratio, but the diet was still a little inferior to the animal protein diet. Furthermore, the addition of



Finnstim in both basal diets did not significantly improve the survival rates of shrimps, which were a little lower in the plant protein diet groups than animal protein diet groups. Nevertheless, the addition of 1.5% Finnstim in plant protein diet resulted in survival rates comparable with the animal protein diet without Finnstim. In conclusion, the addition of 1.5% Finnstim to high plant protein feed could improve palatability to a level similar to the generalized Thai shrimp feed.

Key words: amino acids, betaine, Finnstim, *Penaeus monodon*

Introduction

The intensive culture of fish and crustaceans world-wide is expected to triple by 2020 and this will result in a requirement of 15-18 million tons of dietary protein. The current production of 3.6 million tons fishmeal protein is insufficient for all aquaculture species. The tremendous shortfall in total protein requirement must be made up by plant protein (Finley and Fry, 2009). Increasing the ratio of plant protein however may cause poor palatability, especially for shrimp feed. In order to solve this problem, certain feed attractants need to be added to the feed and this process has been evaluated in our study.

Betaine or trimethylglycine functions as a methyl group donor. Sugar beet is the natural source of betaine. A commercial aquafeed additive using betaine as a main source is produced under the trade name Finnstim. Other amino acid inclusions are glycine, alanine, isoleucine, leucine and valine. The composition is proprietary and is said to be the result of empirical experimentation. The role of Finnstim as a fish feed attractant has been very well documented. However, further studies are required to test its effectiveness as a feed attractant in shrimps.

The current paper studied the role of Finnstim in improving the palatability of high plant protein shrimp feed. Three levels of Finnstim were tested using two basal feeds. One was a generalized Thai shrimp feed which comprised mostly animal protein and high plant protein. The experimental feeding trials were conducted on juvenile *Penaeus monodon*.

Materials and Method

Two kinds of basal diet were formulated. One was a generalized Thai shrimp feed and another was the higher plant protein feed (Table 1). Since generalized feed comprised mostly animal protein which is also higher in shrimp attractants, the latter



feed is formulated in such a way that it would be very low in shrimp natural attractants, and also cheaper to formulate.

Three levels of finnstim, i.e. 0%, 0.75%, and 1.5%, were added to the basal diets. This made a total of 6 treatment diets. Each treatment had 3 replications. This amounted to 18 test units in the feeding trials.

The test unit for the feeding trials was a circular fiber glass tank with a capacity of 150 liters and a cross-sectional area of 0.3 m². Seawater salinity in these tanks was adjusted to 20 ppt during the first 3 weeks, increased to 30 ppt at the end of the 3rd week, with a recirculating water system. The test units were located in a hatchery of the Department of Marine Science, Chulalongkorn University, main Bangkok campus. Ten shrimps of 3-4 grams in size were initially stocked in each tank.

Table 1. Composition of the two control (basal) diets.

Ingredients	Animal Protein*	Plant Protein
Fish Meal (65 % protein)	27	20
Soybean Meal (45 % protein)	20	40
Shrimp Head (40% protein)	10	-
Squid Meal (65% protein)	5	-
Soy Lecithin	1	1
Fish Oil	3	3
Wheat Flour	20.3	17.3
Wheat gluten	5	10
Cholesterol	0.2	0.2
Zeolite	1.5	1.5
Di.Ca.P.	1.5	1.5
Potassium phosphate	1	1
Na-hexametaphosphate	1	1
Vitamin Premix	2	2
Na-alginate	<u>1.5</u>	<u>1.5</u>
	100%	100%

* Generalized Thai shrimp feed.



Feeding occurred 4 times a day (8:00, 12:00, 16:00, and 20:00 hours). Since food conversion was one of the parameters, feeding was monitored and the feeding rate adjusted in accordance to how much food was being consumed.

Data sampling on growth i.e. length and weight, survival, and water quality was done at two week intervals during the eight week experiment.

Results and Discussion

The proximate analysis of the six treatment diets is shown in Table 2. The protein content of the plant protein diets was approximately 3 to 5% lower than that in the animal protein diets. The addition of Finnstim resulted in a 1-2% increase of protein in the basal diets, depending on the amounts added. This evidence showed that Finnstim was a naturally concentrated protein.

Table 3 and 4 summarized the effect of Finnstim on the growth of the shrimps, using length and weight as parameters. Each figure represented the mean and its standard deviation at various time intervals. The covariance analysis showed significant difference between the slopes of growth curves (length v.s. weeks) at a 95% confidence level. The pair tests showed no significant difference between slopes in the treatments with plant protein diet (PPC) and PPC + 0.75% Finnstim, PPC + 0.75% Finnstim and PPC + 1.5% Finnstim, PPC + 1.50% and animal protein (APC). The addition of 0.75% Finnstim in the plant protein diet was not enough to result in an appreciable benefit. The addition of Finnstim at 1.5% in the animal protein diet resulted in the highest growth performance (Table 5).

Table 2. Proximate analysis of the six treatment diets.

	Protein	Lipid	Ash
Plant Protein Control (PPC)	43.37	6.60	14.60
PPC + 0.75 % Finnstim	45.44	6.13	14.43
PPC + 1.50 % Finnstim	46.28	6.36	14.10
Animal Protein Control (APC)	49.57	5.08	10.77
APC + 0.75 % Finnstim	52.48	4.65	10.79
APC + 1.50 % Finnstim	53.29	4.30	10.71



Table 3. Effect of Finnstim on length increase (length in cm) of juvenile *Penaeus monodon*.

Diet	Weeks				
	0	2	4	6	8
Plant Protein Control (PPC)	7.59 ± 0.58	7.64 ± 0.39	8.04 ± 0.47	8.41 ± 0.48	8.68 ± 0.50
PPC + 0.75% Finn	7.61 ± 0.34	7.43 ± 0.43	8.17 ± 0.56	8.54 ± 0.73	8.74 ± 0.75
PPC + 1.50% Finn	7.61 ± 0.29	7.82 ± 0.43	8.26 ± 0.43	8.68 ± 0.58	8.90 ± 0.41
Animal Protein Control (APC)	7.55 ± 0.28	7.89 ± 0.57	8.36 ± 0.63	8.81 ± 0.66	9.18 ± 0.64
APC + 0.75% Finn	8.03 ± 0.49	8.32 ± 0.50	8.74 ± 0.61	9.35 ± 0.55	9.68 ± 0.61
APC + 1.50% Finn	8.53 ± 0.30	8.81 ± 0.35	9.46 ± 0.44	9.81 ± 0.36	10.13 ± 0.44

Table 4. Effect of Finnstim on weight increase (weight in g) of juvenile *Penaeus monodon*.

Diet	Weeks				
	0	2	4	6	8
Plant Protein Control (PPC)	3.20 ± 0.57	3.77 ± 0.67	4.39 ± 0.74	4.74 ± 0.78	5.47 ± 1.11
PPC + 0.75% Finn	3.22 ± 0.53	3.87 ± 0.61	4.73 ± 0.93	5.09 ± 1.22	5.73 ± 1.54
PPC + 1.50% Finn	3.21 ± 0.41	4.04 ± 0.61	4.72 ± 0.74	5.60 ± 0.86	5.96 ± 0.84
Animal Protein Control (APC)	3.09 ± 0.36	4.17 ± 0.90	5.04 ± 1.01	5.77 ± 1.16	6.61 ± 1.31
APC + 0.75% Finn	3.71 ± 0.54	4.76 ± 0.87	5.84 ± 1.03	6.57 ± 1.15	7.64 ± 1.31
APC + 1.50% Finn	4.52 ± 0.59	5.72 ± 0.74	7.04 ± 0.79	8.18 ± 0.89	8.98 ± 1.08

Food conversion rate (FCR) and the survival of shrimps were summarized in Table 5. The Tukey's testing showed that the addition of 1.5% Finnstim in the plant protein diet could significantly improve the FRC, but the diet was still a little inferior



to the animal protein diet. The addition of Finnstim in animal protein diet significantly improved the FRC. Nevertheless the level of 0.75% and 1.50% Finnstim did not differ significantly.

It should be noted that the FRC in this study was the laboratory FRC or in other words “technical FRC”. Therefore, the values were somewhat higher than those normally reported in large grow-out ponds.

As regards survival, Tukey testing revealed that animal protein diets gave a better survival rate than the plant protein diets. The addition of Finnstim in both basal diets significantly improved survival.

According to the above results, it could be concluded that the addition of 1.5% Finnstim in plant protein diet resulted in 8.9% better growth and 11.8% better food conversion compared to the control. This diet was also compatible to the generalized Thai shrimp feed (animal protein diet). The addition of 1.5% Finnstim in the animal protein diet resulted in 17.5% better growth than the 0.75% Finnstim addition and 35.8% better growth than the control. The addition of Finnstim resulted in an approximately 5% improvement in survival.

Table 5. Effects of Finnstim on growth slopes, technical food conversion ratio (FCR), and survival of shrimps in expressed as a percentage.

	Growth Slopes	FCR	Survival (%)
Plant Protein Control (PPC)	0.145 ^a	2.92 ^a	77.5 ^a
PPC + 0.75% Finn	0.153 ^{ab}	2.80 ^{ab}	78.3 ^a
PPC + 1.50% Finn	0.171 ^{bc}	2.61 ^b	84.2 ^{ab}
Animal Protein Control (APC)	0.208 ^c	2.38 ^c	85.0 ^{ba}
APC + 0.75% Finn	0.215 ^d	2.12 ^d	90.8 ^b
APC + 1.50% Finn	0.210 ^e	2.00 ^d	90.0 ^b

Within a column, values with different superscripts are significantly different ($P < 0.05$).

The study results presented are comparable with the feeding trial reported by Ung and Junilla (1989). However, their study did not use a high plant protein basal diet. Smith et. al. (2005) studied the effectiveness of different attractants including Finnstim. They found no significant difference in the amount the shrimp consumed of any of the feeds, but the growth rate was faster on the feeds containing crustacean meal or krill meal.



References

- Finley W, Fry J, 2009. Expanding opportunities for vegetable proteins in aquaculture feeds. *World Aquaculture* 40 (2) : 29-32.
- Smith DM, Tabrett SJ, Barclay MC, Irvin SJ, 2005. The efficacy of ingredients included in shrimp feeds to stimulate intake. *Aquaculture Nutrition* 11 (4) : 263-272.
- Ung E, Junilla M, 1989. Preliminary observations on the nutritional effects of a betaine/amino acid mixture : survival, growth, and food conversion of juvenile *Penaeus monodon* fed with Finnstim. Report of the workshop on Shrimp and Finfish feed Development. *FAO Project Report* No. 11.



Restoration of Renal Function in Diabetes Mellitus: Is It Plausible ?

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Abstract

The present therapeutic strategy fails to improve renal function in diabetes mellitus, which commonly leads to end-stage renal failure. It is noted that treatment is generally initiated at a late stage due to the lack of sensitivity of available diagnostic markers such as serum creatinine or microalbuminuria. We plan to study the mechanism of vascular repair in order to explain such therapeutic failure in diabetes mellitus.

The study indicates that the mechanism of vascular repair is markedly defective in the late stage chronic kidney disease associated with diabetes mellitus. A defective angiogenic factor namely vascular endothelial growth factor (VEGF) receptor 1 induces an abnormal activation through the antiangiogenic pathway (VEGF → VEGF receptor 2) preventing enhancement of nitric oxide production. In contrast, adequate angiogenic factors namely VEGF, VEGF receptor 1 observed in the early stage diabetic nephropathy (normal serum creatinine, normoalbuminuria, a slightly impaired creatinine clearance, an abnormally elevated fractional excretion of magnesium reflecting chronic kidney disease), would activate through the classical pathway (VEGF → VEGF receptor 1), inducing coupling of endothelial nitric oxide synthase, and enhancing nitric oxide production. In accordance with the preceding information treatment at the early stage of diabetic nephropathy can restore renal perfusion and function.

Key words: diabetic nephropathy, vascular repair, renal perfusion, renal function, fractional excretion of magnesium, vasodilators



There is a general consensus that treatment of diabetic nephropathy under common practice fails to restore renal function. It is noted that such diabetic patients are associated with altered serum creatinine concentrations, or the presence of proteinuria which reflects a rather late stage of chronic kidney disease (creatinine clearance less than 60 ml/min/1.73m²). This is due to the lack of sensitivity of the available diagnostic markers such as serum creatinine or microalbuminuria, which become abnormal only when renal function impairment is approaching the 50 percent level.¹ Since renal microvascular disease is believed to be the crucial determinant inducing chronic renal ischemia and renal disease progression, the therapeutic target should be the administration of vasodilators to improve renal perfusion and function.² Surprisingly renal microvascular disease does not seem to respond to vasodilators in this late stage of diabetic nephropathy. We then decide to explore this issue further by studying the mechanism of vascular repair in order to explain why there is no response to vasodilators in these patients.

Mechanism of vascular repair in the late stage of diabetic nephropathy (creatinine clearance less than 60 ml/min/1.73m²)

A defective mechanism of vascular repair was observed in these patients with the late stage of chronic kidney disease.³ A defective angiogenic or classical pathway (VEGF → VEGF receptor 1) due to an impaired VEGF receptor 1 would trigger an abnormal activation of VEGF through the alternative (antiangiogenic) pathway (VEGF → VEGF receptor 2), which would be unable to induce coupling of endothelial nitric oxide synthase, and therefore unable to enhance nitric oxide production. This would explain the unresponsiveness of renal microvessels to vasodilators, and thus, the inability to induce vasodilation, and the failure to enhance renal perfusion and function in late stage diabetic nephropathy.

Mechanism of vascular repair observed in the early stage of diabetic nephropathy (normal serum creatinine, normoalbuminuria, a mildly impaired creatinine clearance, an abnormally elevated fractional excretion of magnesium reflecting chronic kidney disease)

In contrast to the above finding documented in the late stage diabetic nephropathy, the mechanism of vascular repair appears to be normal at an early stage of diabetic nephropathy.⁴ In this regard, a normal status of angiogenic factors namely VEGF, VEGF receptor 1, would allow normal activation through the classical pathway, which would be able to induce coupling of endothelial nitric oxide



synthase, and therefore enhance nitric oxide production. Enhanced nitric oxide production would facilitate the renal microvessels response to vasodilators, and therefore increase renal perfusion and eventually enhance renal function.

An appropriate therapeutic strategy to restore renal perfusion and function in early stage of diabetic nephropathy

In accordance with the preceding information, the normal status of mechanism of vascular repair observed in early stage of diabetic nephropathy would be suitable for the process of enhancing renal perfusion and renal regeneration. A correction of renal ischemia would inhibit the degenerative process, and allow the regenerative arm of vascular homeostasis to take place. Improved renal perfusion would induce the reparative process of the nephronal structure.⁵⁻⁷ This view is supported by (1) the improvement in the fractional excretion of magnesium — an index reflecting the suppression in the magnitude of tubulointerstitial fibrosis following treatment with vasodilators. (ii) the improvement in creatinine clearance. This successful restoration of renal perfusion and function implies that an effective preventive strategy to minimize end-stage renal failure could be accomplished under this new conceptual view of early treatment in diabetes mellitus.

Acknowledgement

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References

- ¹ Futrakul N, Sila-asna M, Futrakul P, 2007. A therapeutic strategy towards restore renal function in chronic kidney disease. *Asian Biomed*, 1:33-44.
- ² Futrakul N, Yenrudi S, Sensirivatana R, Sensirivatana R, Watana D, Laohapaibul A, Watanapenphaibul K, Futrakul S, 2000. Peritubular capillary flow determinestubulointerstitial disease in idiopathic nephritic syndrome. *Ren Fail*, 22:329-335.
- ³ Futrakul N, Butthep P, Futrakul P, 2009. Altered vascular homeostasis in type 2 diabetic nephropathy. *Ren Fail*, 31:207-310.
- ⁴ Futrakul N, Futrakul P, 2010. An adequate vascular repair in normoalbuminuria type 2 diabetic nephropathy. *Asian Biomed 2010*; 4:153-157.



- ⁵ Futrakul N, Butthep P, Futrakul P, Sitprija V, 2007. Improvement of renal function in type 2 diabetic nephropathy. *Ren Fail*, 29:155-158.
- ⁶ Ritt M, Ott C, Raff SC, Schneider MP, Schuster I, Hilgers KF, Schlaich MP, Schneder RE, 2009. Renal vascular endothelial function in hypertensive patients with type 2 diabetes mellitus. *Am J Kidney Dis*, 53:281-289.
- ⁷ Futrakul N, Futrakul P, 2010. Improved vascular repair is relevant to enhanced renal function with vasodilators in early stage of chronic kidney disease. *Asian Biomed*, 4:153-157.



The Genus *Gagnepainia* K. Schum. (Zingiberaceae) in Thailand

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Abstract

Two rare Thai medicinal plant species of the genus *Gagnepainia* K. Schum. (family Zingiberaceae), *G. godefroyi* (Baill.) K. Schum. and *G. thoreliana* (Baill.) K. Schum., are enumerated. Descriptions and illustrations of both taxa are given.

Key words: *Gagnepainia* K. Schum., Thailand, *G. godefroyi* (Baill.) K. Schum., *G. thoreliana* (Baill.) K. Schum.

Introduction

As a part of our effort to establish fundamental knowledge, particularly on ethnobotany and taxonomy, of the Thai Zingiberaceae, one of the most important medicinal plant family in Thailand, for future research and development, we have continued studying on the tribe *Globbeae*. As a result, the genus *Hemiorchis* Kurz in Thailand was revised (Picheansoonthon 2009). A new taxon, *Globba ranongensis* Picheans. & Tiyawor. was also recently added (Picheansoonthon & Tiyaworanant, 2010).

K. Schum. (1904) transferred 3 species previously placed under the genus *Hemiorchis* Kurz to his new genus, *Gagnepainia* K. Schum.: *G. harmandii* (Baill.) K. Schum., *G. godefroyi* (Baill.) K. Schum., and *G. thoreliana* (Baill.) K. Schum. based mainly on the longer (than the labella) filaments and the erect anthers. The genus was named in honour of Francois Gagnepain (1866-1952), a famous French botanist. The type specimens of these 3 species were collected from the former French Indochina. Since then, no other new taxa have been added.

K. Larsen (1996) listed 2 species, *G. godefroyi* (Baill.) K. Schum. and *G. glabra* K. Larsen & S. S. Larsen. The latter species was presumably their new species.



In fact, it has never been published. A few years later, they listed all 3 taxa for Thailand (Larsen & Larsen, 2000). However, based on available herbarium materials from major herbaria (BK, BKF, QBG, SING, K, and P) and from our field trips throughout Thailand, we have encountered only 2 taxa, *G. godefroyi* (Baill.) K. Schum. and *G. thoreliana* (Baill.) K. Schum in Thailand. Several populations around the country were investigated and both species show several deviations from the types and original descriptions. The distribution of this genus in Thailand is revised here for the first time.

Gagnepainia

K. Schum. in Engl. Pflanzenr. 4(46). 20 Heft: 129. 1904; Loesener in Engl., Nat. Pflanzenfam. 2. ed. 15a: 581. 1930; Larsen *et al.* in Kubitzki, Fam. Gen. Vasc. Pl. 4: 488. 1998.-non Ehrenb. ex Schweinf. Beitr.–*Hemiorchis* Baill. in Bull. Soc. Linn. Paris I: 1195. 1985.

Perennial herb, rhizomes short. Leafy shoots produced after flowering stems, Leaves oblong or oblong-lanceolate, petiolate. Flowers in pedunculate spikes, usually crowded at the tips of elongating tomentose rachis; calyx tubular, lobes ovate, apex acute; corolla tube slightly dilated towards the mouth, lobes ovate-oblong, recurved; staminodes broadly obovate, or suborbicular; labellum 3-lobed, median lobe form a club-shape elongated appendages, broader than long, emarginate; filament longer than the labellum, curved; anther linear; ovary unilocular; placenta 3, parietal; stylodial glands 2, filiform. Capsules subglobose to ovate, crowned with persistent calyces. Seeds subglobose to globose, arillate.

Three species are distributed in Vietnam, Laos, Cambodia and Thailand. Two species are native to Thailand

Key to Species

1. Lower leaf surface pubescent to sericeous, flowers green.....1.**G. godefroyi**
 1. Lower leaf surface glabrous, flower whitish.....2.**G. thoreliana**

1. **Gagnepainia godefroyi** (Baill.) K. Schum. in Engl. Pflanzenrch. Heft 20:130 1904.–*Hemiorchis godefroyi* Baill. in Bull. Soc. Linn. Paris I: 1196. 1890. Figures 1, 2 and 5B.



Small perennial herb. *Leafy shoots* with 2-4 sheaths at base; leaf sheaths hairy, 2.5-12 by 1.6-2.4 cm, green, pubescent with white margin, upper with longitudinal green or white line. *Leaves* petiolate, 3.5-13.5 by 0.6-1.6 cm, some winged; lamina narrowly ovate-elliptic, tapering towards the petiole; upper surface green, hairy, lower surface pale green, pubescent, 7.5-33.5 by 4-12.5 cm. *Flowering shoots* 17-42 cm; peduncle and rachis pubescent. *Flowers* 6-36, greenish, ebracteate; calyx tubular, 0.9-1.8 cm long, apex 3-lobed, the apices acute or obtuse, green; corolla tubes 1.4-2.2 cm long; dorsal corolla lobe ovate-oblong, 6-9 by 2-5 mm, greenish, recurved; lateral corolla lobe ovate-oblong, 5.6-7.2 by 2-4 mm, greenish, recurved; lateral staminode broadly obovate to suborbicular, 6-9 by 3-5 mm, greenish; labellum pale green, 3-lobed, median lobe whitish, formed a club-shape elongated appendage, 2-3 by *c.* 0.5 mm, lateral lobes broadly obovate to suborbicular, 2.5-4 by 2-3 mm, with 2 elongated appendage, 1-1.5 by *c.* 0.5 mm; filament 7-8 mm long; anther 4-4.5 by *c.* 1.5 mm, thecae diverging towards apex, opening by longitudinal slits; ovary ellipsoid, *c.* 4 mm long, sessile, tomentose; stylodial glands 2, filiform, *c.* 4 mm long. *Fruits* capsular, oblong-ovoid, 1.9-3.4 by 1.2-2.5 cm, hairy, crowned with persistent calyces. Seeds globose to subglobose, *c.* 3 mm diam, yellowish to light brownish, hairy, aril white.

Thailand.—CENTRAL [Namtok Samlun NP, Changwat Saraburi], SOUTH-EASTERN [Khao Khiew, Changwat Chonburi]; NORTH-EASTERN [Phu Sa Dok Bua NP, Changwat Mukdahan]; EASTERN [Pha Taem NP, Changwat Ubon Ratchathani]

Distribution.—LAOS [Phu Luang, the Bolaven Plateau, Attapeu and Champasak Provinces]; CAMBODIA [Boeng Yeak Lom and Virachay NP, Ratanakiri Province]

Ecology.—Deciduous dipterocarp forest and bamboo forest, at the altitude of 30–700 m.

Vernacular name.—Toobmoob Khao Khwai (ตูปมูบเขากววย), Wan Krahang Khiew (ว่านกระหังเขี้ยว), Wan Morakot (ว่านมรกต), Pee Suea Khiew (ผีเสื้อเขี้ยว)

Use.—Medicinal

2. **Gagnepainia thoreliana** (Baill.) K. Schum. in Engl. Pflanzenrch. Heft 20:130. 1904.—*Hemiorchis thoreliana* Baill. in Bull. Soc. Linn. Paris I:1196. 1890. Figures 3, 4 and 5A.

Small perennial herb. *Leafy shoots* with 3-5 sheaths at base; leaf sheaths hairy, 2.2-13.6 by 1.4-2.4 cm, green pubescent with white margin, upper with longitudinal green or white line; ligule 2-3 mm long, pubescent, apex bilobed.

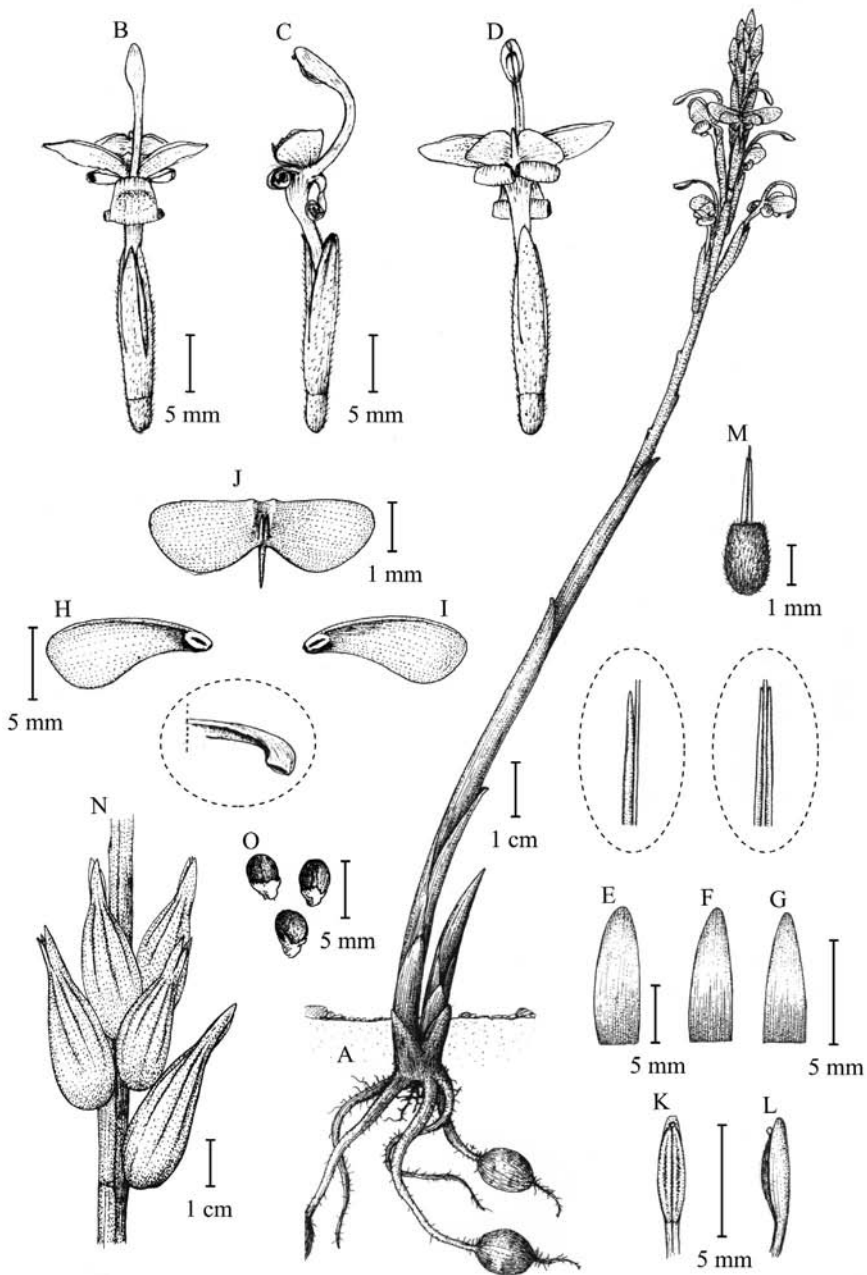


Figure 1 *Gagnepainia godefroyi* (Baill.) K. Schum.

A. A flowering stem, showing roots, rhizome, leaf sheaths, and an inflorescence with a front view of a flower and a side view of a flower. B, C & D. A flower; rear view (B), side view (C), and front view (D). E. Dorsal corolla lobe. F & G. Lateral corolla lobes. H & I: Lateral staminodes; J: Labellum; K & L. Anther, front view (K) and side view (L). M. ovary and stylodial glands. N. Upper part of flowering stem showing infructescence. O. Seeds. Drawn by Chalermchoke Boonchit.

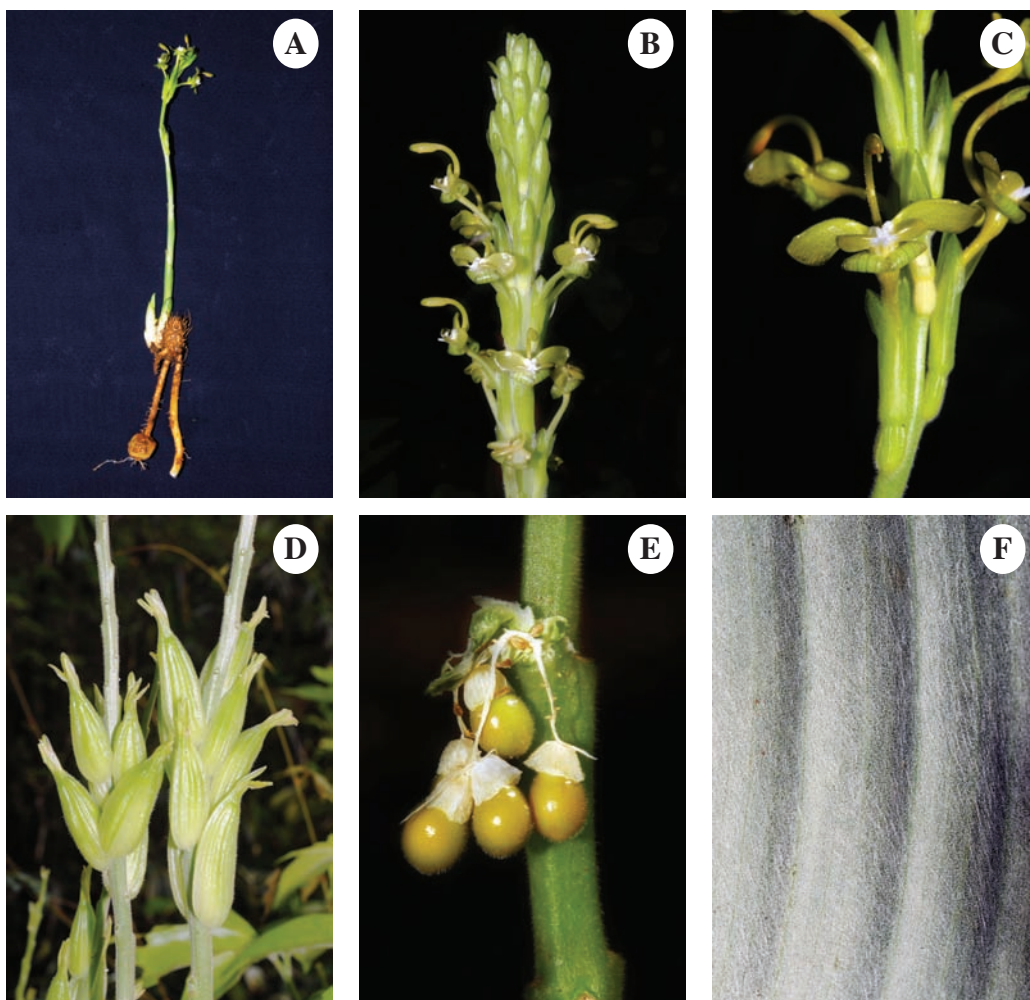


Figure 2 *Gagnepainia godefroyi* (Baill.) K. Schum.

A. A flowering shoot, showing roots, rhizome, leaf sheaths, and an inflorescence. B. An inflorescence. C: Close-up of flowers. D. Infructescences. E. Seeds. F. Lower leaf surface. Photographed by Chayan Picheansoonthon.

Leaves petiolate, 4.7-10.3 by 0.8-1.1 cm, some winged; lamina elliptic to obovate, 22.7-36.0 by 6.5-8.9 cm, base tapering towards the petiole, apex acuminate, margin entire to slightly undulate, upper surface hairy, lower surface glabrous. *Flowering shoots* 29.6-40.2 cm long, peduncle and rachis pubescent. *Flowers* up to 50, ebracteate; calyx tubular, 1.3-1.5 cm long, 3-lobed, lobes acute to obtuse, white; corolla tube 1.8-2.1 cm long; dorsal corolla lobe ovate-oblong, whitish, 1.1-1.3 cm

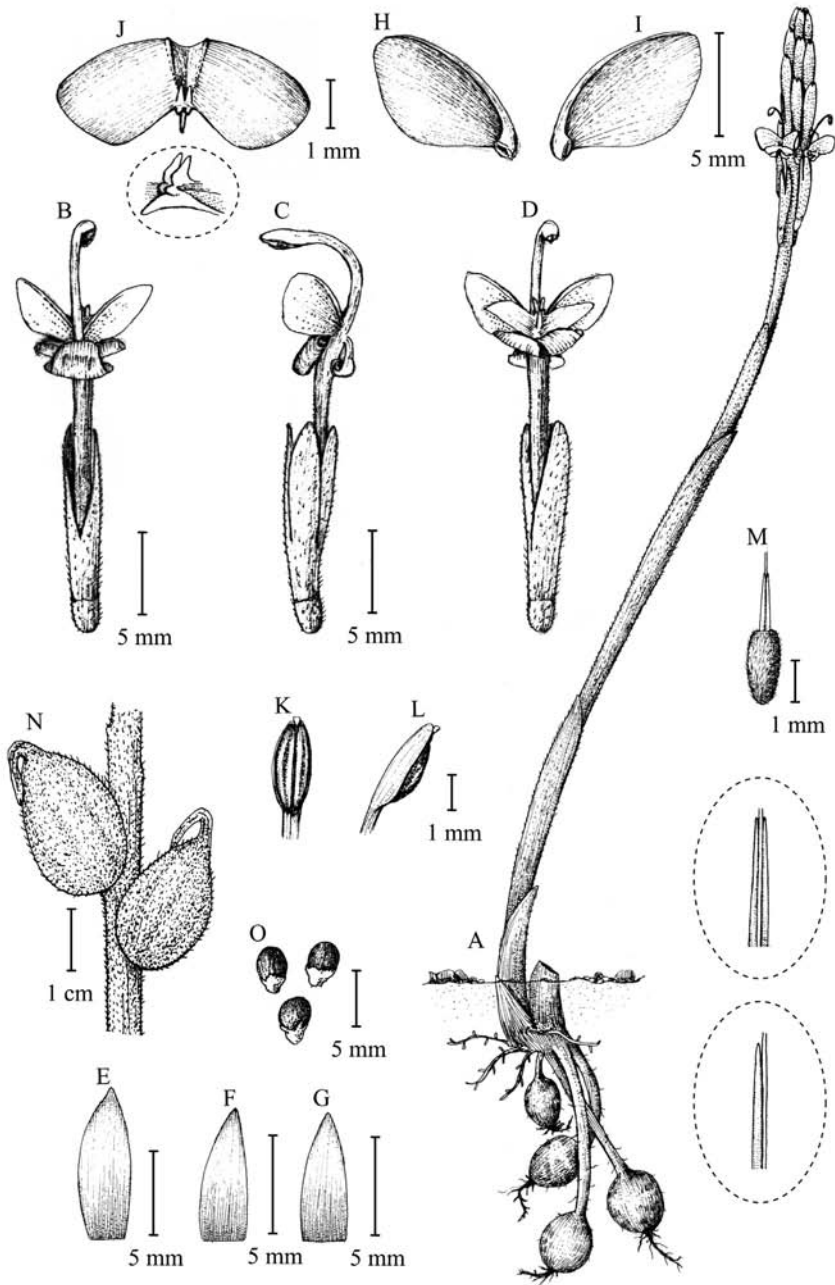


Figure 3 *Gagnepainia thoreliana* K. Schum.

A. A flowering shoot showing roots, rhizome, leaf sheaths and an inflorescence. B, C & D. A flower; rear view (B), side view (C), and front view (D). E. Dorsal corolla lobe. F & G. Lateral corolla lobes. H & I. Lateral staminodes. J. Labellum. K & L. Anther, front view (K) and side view (L). M. ovary and stylodial glands. N. Upper part of flowering stem showing infructescence. O. Seeds. Drawn by Chalermchoke Boonchit.

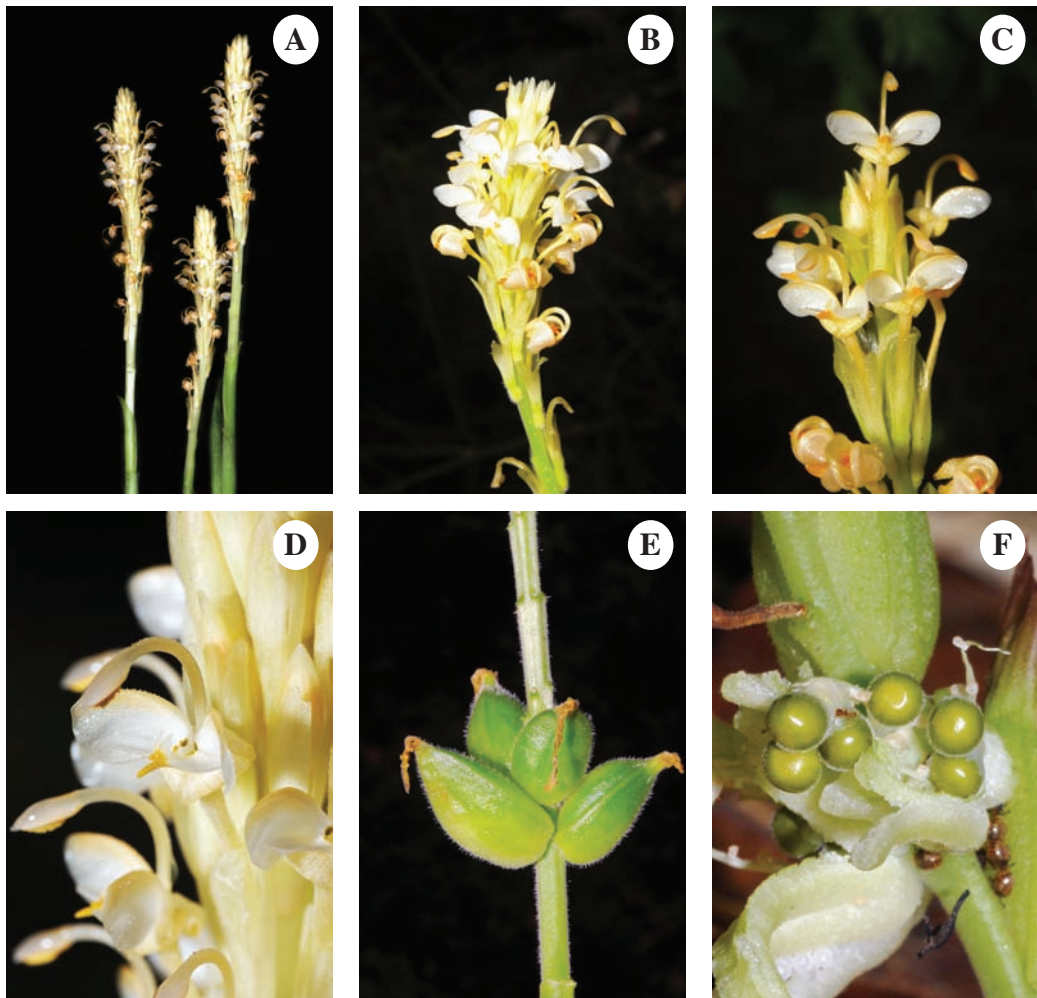


Figure 4 *Gagnepainia thoreliana* K. Schum.

A. Flowering shoots. B. An infructescence. C. Close-up of flowers in different views. D. An oblique view of flowers. E. An infructescence, showing fruits with persistent calyces. F. Dehiscing fruit showing seeds. Photographed by Chayan Picheansoontorn.

by 3-5 mm, recurved; lateral corolla lobe ovate-oblong, 6-8 by 3-5 mm, whitish, recurved; lateral staminodes broadly obovate to suborbicular, 5-6 by 3-5 mm, white with yellow upper margin; labellum white, 3-lobed, median lobe formed a yellow club-shape elongated appendage, *c.* 4 by 2.5 mm, lateral lobes broadly obovate to suborbicular, 2.5-3.5 by *c.* 3 mm with 4 elongated appendages; filament 1-1.3 cm



long; anther *c.* 4 by 1 mm, thecae diverging toward apex, opening by longitudinal slits; ovary sessile, tomentose, ellipsoid, *c.* 3 mm long; stylodial glands 2, filiform, *c.* 4.5 mm long. Fruits capsular, ovoid, 1.7-3 by 1.3-1.6 cm, hairy, crowned with persistent calyces. Seeds globose, *c.* 3 mm diam, greenish, aril white.

Thailand.—NORTHERN [Noen Pisawong, Amphoe Mae Sod, Changwat Tak; Namtok Tee Lorsu NP, Amphoe Umpang, Changwat Tak; Doi Chiang Dao WS, Amphoe Chiang Dao, Changwat Chiang Mai; Huai Suea Tao, Amphoe Muang Mae Hong Son, Changwat Mae Hongson]; NORTH-EASTERN [Nam Nao NP, Amphoe Nam Nao, Chawat Chaiyapum; Phu Ruea NP, Amphoe Phu Ruea, Changwat Loei]; WESTERN [Pong Phu Ron, Amphoe Thong Pha Pum, Changwat Kanchanaburi].

Distribution.—Laos and Cambodia

Ecology.—Mixed evergreen forests and bamboo forests, at the altitude of 60-560 m.

Vernacular name.—Wan Krahang (ว่านกระหัง), Wan Krahang Khao (ว่านกระหังขาว), Wan Petch Na Tang (ว่านเพชรหน้าตั้ง), Wan Kon Na Tang (ว่านค้อนหน้าตั้ง), Choe Kinaree (ช่อกินรี)

Use—Medicinal

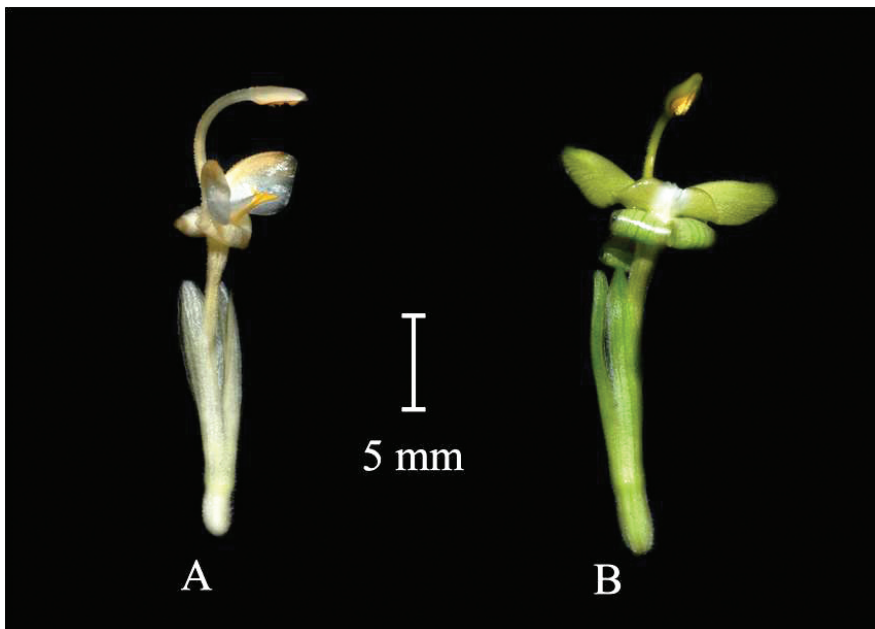


Figure 5 Comparison of the flowers of *G. thoreliana* (A, an oblique view) and of *G. godefroyi* (B, a front view)



Acknowledgement

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References

- Larsen K, 1996. A Preliminary Checklist of the Zingiberaceae of Thailand. Thai For. Bull. (Bot.) 24: 35-49.
- Larsen K, Larsen S.S. Gingers of Thailand. Chiang Mai: Queen Sirikit Botanic Garden. p. 163.
- Picheansoonthon C, 2009. The *Genus Hemiorchis* Kurz (Zingiberaceae) in Thailand. J. Roy. Inst. Thai. 1. p. 115-123.
- Picheansoonthon C, Tiyaworanant, S. 2010. A New Species of *Globba* (Zingiberaceae) from Southern Thailand. J. Jpn. Bot. 85(1): 25-29.
- Schuman K, 1904. Zingiberaceae. In: Engler A. (ed.), 1904. Das Pflanzenreich. 4(46), Heft 20. p. 127-128.



Combination Anti-malarial Therapy and WHO Recommendations

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Abstract

Malaria infection is a major global health problem causing at least 1 million deaths per year. *P. falciparum* parasite in many areas has developed resistance to antimalarial monotherapy. The use of antimalarial combinations will delay the onset and slow the rate of spread of resistance. WHO recommends that all countries experiencing resistance to conventional monotherapies, such as chloroquine, quinine, amodiaquine or sulfadoxine–pyrimethamine, should use combination therapies, preferably those containing artemisinin derivatives or artemisinin-based combination therapies. Other alternative combination therapies are artesunate plus tetracycline or doxycycline or clindamycin and quinine plus tetracycline or doxycycline or clindamycin.

Key words: Malaria, Combination therapy

Introduction

Malaria remains the most important parasitic infection of man. Each year, 300-500 million of the world's population are infected and 1-3 million people die from malaria infection. The development of drug resistance in both falciparum and vivax malaria, the two most important forms of human malaria, will further increase the already massive burden of morbidity and mortality from malaria (Figure 1, Pukrittayakamee & White, 2002; WHO, 2010)

Plasmodium falciparum parasite in many tropical countries has developed resistance to many major antimalarial drugs: chloroquine, sulfadoxine-pyrimethamin, quinine and mefloquine (Figure 2). The artemisinin derivatives have been used extensively in Vietnam and Thailand over the past few years and *P. falciparum* has recently shown reduced in vivo susceptibility to artesunate in western Cambodia as

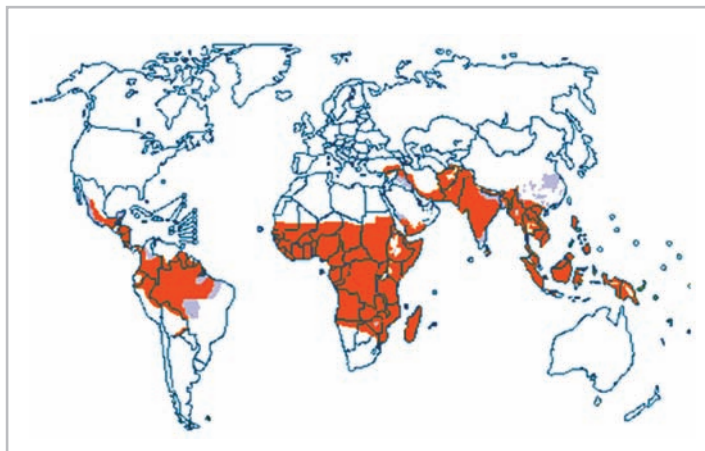


Figure 1 World Malaria Situation (WHO, 2009)

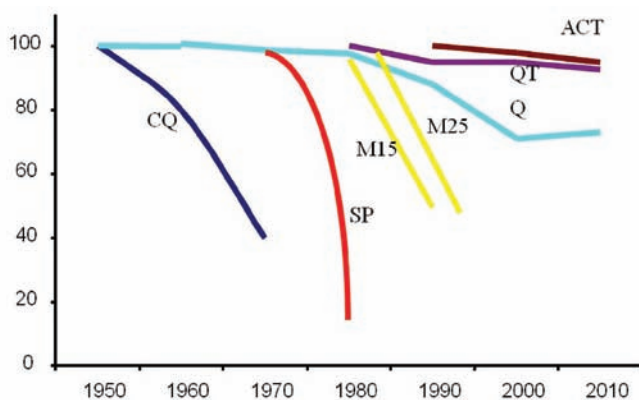


Figure 2 Cure rate of major antimalarial drugs for treatment of falciparum malaria. CQ = chloroquine, SP = sulfadoxine-pyrimetamine, M15 = mefloquine 15 mg/kg, M25 = mefloquine 25 mg/kg, Q = quinine, QT = quinine plus tetracycline, ACT = artemisinin base-combination therapy.



compared to northwestern Thailand (Dondorp et al, 2009). In the last decade *P. vivax* in Indonesia also developed resistance to chloroquine (the cheap and widely available antimalarial drug). High-level chloroquine resistance has been well documented on the northern part of the island of New Guinea and in Sumatra, and there have been sporadic reports from other geographic locations.

The use of antimalarial combinations will delay the onset and slow the rate of spread of resistance—especially when drug resistance mutant alleles are rare. The concept that resistance could be delayed or prevented by combining drugs with different targets was developed first in the treatment of tuberculosis. It has since been adopted widely for the treatment of cancer and HIV infection. Thus combinations will considerably delay the emergence of drug resistance. They also inhibit the spread and further increase of established low-grade resistance.

In the last two decades, there have been several clinical studies on various antimalarial drugs in combination for the treatment of chloroquine resistant falciparum malaria. The choice of combined drugs for uncomplicated falciparum malaria is usually an antimalarial-antibiotic or two antimalarials with short and long half lives. For adult patients, artemisinin-based combination therapy (ACT) and quinine-tetracycline are effective worldwide with > 90% cure rates (Figure 2).

Artemisinin-based combination therapy (ACT)

The artemisinin drugs have considerable advantages over other compounds for use in antimalarial combinations (Pukrittayakamee & White, 2002, WHO, 2010). They are very active and well tolerated, and they reduce parasite numbers more than the other antimalarials by approximately 10,000 fold per asexual cycle. Although there are some minor differences in oral absorption and bioavailability between the different artemisinin derivatives, there is no evidence that these differences are clinically significant in currently available formulations. It is the properties of the partner medicine that determine the efficacy and choice of combination. Resistance to the artemisinin's partner medicines compromises the efficacy of the ACT (Figure 3). The available ACTs already recommended for the treatment of uncomplicated falciparum malaria are artesunate plus mefloquine, artemether plus lumefantrine, artesunate plus amodiaquine and artesunate plus sulfadoxine-pyrimethamine. Other additions to the list of ACTs options for the treatment of uncomplicated falciparum malaria are dihydroartemisinin-piperaquine (Artekin) and pyronaridine-artesunate (Pyramax).

Artesunate plus mefloquine

Since mid-1994 mefloquine has been combined with a 3-day course of artesunate, and there has been no further decline in mefloquine sensitivity. More recently artemisinin and its derivatives in combination with mefloquine, have been very effective. They have accelerated recoveries, increased cure rates, reduced transmissibility and appear also to have delayed the further development of resistance and reduced the incidence of disease. Artesunate plus mefloquine is currently available as blister packs with separate scored tablets containing 50 mg of artesunate and 250 mg base of mefloquine, respectively. A fixed-dose formulation of artesunate and mefloquine is at an advanced stage of development. A target dose of 4 mg/kg/day artesunate given once a day for 3 days and 25 mg/kg of mefloquine either split over 2 days as 15 mg/kg or 10 mg/kg over 3 days, equivalent to 8.3 mg/kg/day once a day for 3 days.

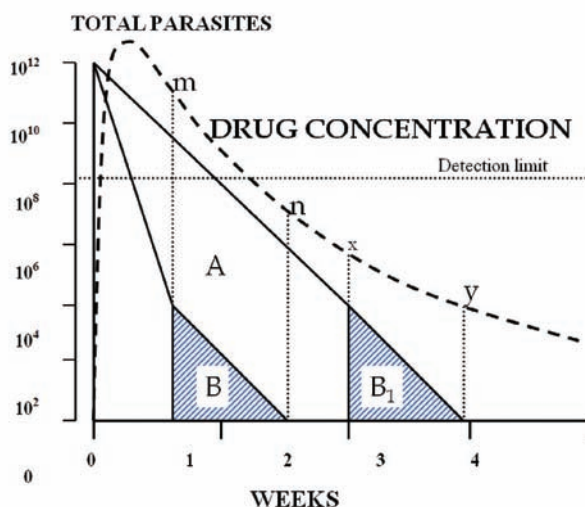


Figure 3 Combining an artemisinin derivative (in this case artesunate given for 3 days: shaded box at the top left of the panel) with mefloquine improves cure rates. This is because the parasites that remain after artesunate has been stopped are exposed to much higher concentrations of mefloquine (a to b on the mefloquine blood concentration profile) than the corresponding residium of viable parasites (shown as equivalent shaded areas under the parasite-time graphs) when mefloquine is used alone (c to d). Blood mefloquine levels are shown as a broken line. (adapted from Pukrittayakamee & White, 2002)



Artesunate plus amodiaquine

This is currently available as a fixed-dose formulation and blister packs of separate scored tablets containing 50 mg of artesunate and 153 mg base of amodiaquine, respectively. A target dose of 4 mg/kg/day artesunate and 10 mg/kg/day amodiaquine once a day for 3 days. This combination was sufficiently efficacious only where 28-day cure rates with amodiaquine monotherapy exceeded 80%.

Artemether plus lumefantrine

This is currently available as a fixed-dose formulation with dispersible or standard tablets containing 20 mg of artemether and 120 mg of lumefantrine. An advantage of this combination is that lumefantrine is not available as a monotherapy, and it has never been used by itself for the treatment of malaria. Lumefantrine absorption is enhanced by co-administration with fat. It is essential that patients or caregivers are informed of the need to take this ACT immediately after a meal or drink containing at least 1.2 g fat—particularly on the second and third days of treatment. The recommended treatment is a 6-dose regimen over a 3-day period. The adult dose is 4 tablets given twice a day for 3 days. This extrapolates to 1.7/12 mg/kg body weight of artemether and lumefantrine, respectively, per dose.

Dihydroartemisinin plus piperazine

Dihydroartemisinin plus piperazine is currently available as a fixed-dose combination with tablets containing 40 mg of dihydroartemisinin and 320 mg of piperazine. A target dose of 4 mg/kg/day dihydroartemisinin and 18 mg/kg/day piperazine once a day for 3 days, with a therapeutic dose range between 2–10 mg/kg/day dihydroartemisinin and 16–26 mg/kg/dose piperazine .

Artesunate plus tetracycline or doxycycline or clindamycin

Artesunate plus tetracycline or doxycycline or clindamycin are reserved for the very rare occasions of treatment failure with the recommended ACTs and in some special groups, e.g. pregnant women failing ACT treatment. The very recommended doses are artesunate (2 mg/kg once a day) plus tetracycline (4 mg/kg four times a day or doxycycline (3.5 mg/kg once a day) or clindamycin (10 mg/kg twice a day). Any of these combinations should be given for 7 days.

Quinine-tetracycline/Quinine-clindamycin

Quinine in combination with tetracycline has been widely used for nearly 20 years in multi-drug resistant areas. In Thailand, the cure rate of monotherapy with quinine given for 7 days was 100% in 1963. Since the 1970s there has been a decline in the susceptibility to quinine but this has been relatively slow (Figure 2). The addition of a tetracycline, most commonly, doxycycline, to quinine consistently improves the cure rates for falciparum malaria to over 90%. A limitation of this combination is that tetracycline cannot be used in children less than 8 years old or during pregnancy. Quinine-clindamycin has proved effective in adults and children with acute malaria in South America, Africa and in Thailand where the most drug-resistant *P. falciparum* strains are found (Pukrittayakamee et al, 2000, Figure 4). The regimen was well tolerated, and there were no adverse effects attributable to clindamycin.

WHO Recommendations on malaria treatment (WHO, 2010)

WHO Guidelines Development Group recommends that all countries experiencing resistance to conventional monotherapies, such as chloroquine, amodiaquine or sulfadoxine–pyrimethamine, should use combination therapies, preferably those containing artemisinin derivatives for falciparum malaria. The ACT

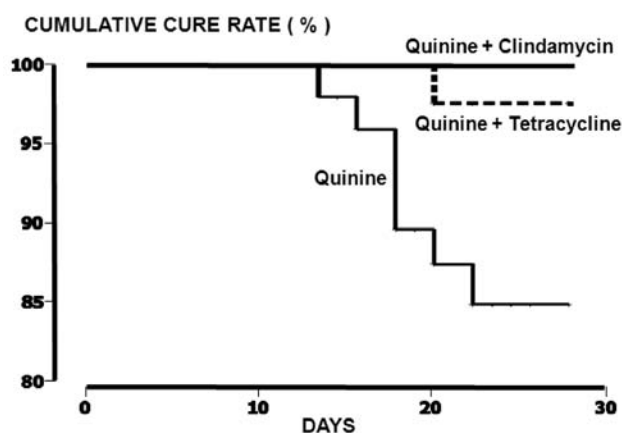


Figure 4 Cumulative cure rates for quinine and quinine in combination with tetracycline or clindamycin in patients with uncomplicated *P.falciparum* malaria. (adapted from Pukrittayakamee et al, 2000).



has the advantages of simplicity, and where available, a fixed-dose combination formulation improves compliance. Antimalarial treatments on the basis of the evidence from current practice and the consensus opinion regarding preference may use an alternative ACT known to be effective in the region e.g. artesunate plus tetracycline or doxycycline or clindamycin, quinine plus tetracycline or doxycycline or clindamycin .

References

- Dondorp AM, Nosten F, Yi P, Das D, Phyo AP, Tarning J, Lwin KM, Arie F, Hanpithakpong W, Lee SJ, Ringwald P, Silamut K, Imwong M, Chotivanich K, Lim P, Herdman T, An SS, Yeung S, Singhasivanon P, Day NP, Lindegardh N, Socheat D, White NJ, 2009. Artemisinin resistance in *Plasmodium falciparum* malaria. *N Engl J Med*, 361: 455-467.
- Pukrittayakamee S, Chantra A, Vanijanonta S, Clemens R, Looareesuwan S, White NJ, 2000. Therapeutic responses to quinine and clindamycin in multidrug resistant *falciparum* malaria. *Antimicrob Agents Chemother*, 44: 2395-2398.
- Pukrittayakamee S, White NJ, 2002. Combination therapy: making the best use of existing drugs. *Pharmaceutical News*, 8: 21-25.
- WHO. Guidelines for the treatment of malaria, second edition. *WHO*, 2010



Biodiversity in Thailand

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Abstract

Thailand is a relatively small country, but she is rich in biodiversity, comprising approximately 6-10% of the total species known thus far. In the past, 70% of the total land area was covered with various kinds of tropical forests providing terrestrial and aquatic habitats for life forms in complex ecosystems. This natural biology that surrounded the local community has influenced the development of folklore, cultural diversity and traditional knowledge. Such local wisdom has been perpetuated by being passed down from generation to generation. The Thai people lived peacefully and sustainably, surrounded by the balanced and green environment, for many centuries until the 1960s, when the Thai government launched the first National Economic and Social Development Plan. Such modernization in industry and agriculture accompanying globalization trends in capitalism and unsustainable development led to deforestation and environmental problems, including climate change and global warming. As a consequence, there has been a tremendous loss of biodiversity and ecosystems. Many species have become endangered and some are at critical population levels and prone to extinction if action is not taken to save them. Such loss of biodiversity is likely to have tremendous effects—often unpredictable—on the productive lives of all living things including ourselves. A basic knowledge of these living things is needed in order to facilitate conservation and management and to better understand how to use biological resources in a sustainable manner. Therefore, the Special Program for Biodiversity Research and Training (BRT) was established in November, 1995, under the joint sponsorship of TRF and BIOTEC, to support basic research in tropical biology as well as studies on policy development and management of biodiversity in Thailand.

Key words: biodiversity, culture, traditional knowledge, conservation, natural capital, sustainable development.



The United Nations declared 2010 as the International Year of Biodiversity to coincide with the 2010 Biodiversity Target of the Convention on Biological Diversity (CBD) adopted at the World Summit on Sustainable Development (WSSD or “Rio+10”), in Johannesburg, South Africa, in August 2002. The celebrations of the International Year of Biodiversity will raise public awareness of the importance of biodiversity in many countries throughout the world including Thailand. Thus, this year is a unique opportunity to emphasize the vital role of biological diversity in sustaining life on Earth and supporting ecological services as well as human well-being and reducing poverty.

Biodiversity is the variety of life forms-microorganisms, flora and fauna including humans-at all levels of organization from genes to populations, species and ecological systems existing throughout the world. Such diversity of life is a legacy of evolutionary processes (Figure 1). This variety of life has long been and continues to be an essential resource for human survival in terms of food, medicines, housing and clothing as well as ecological services including aesthetics and ecotourism. Thus, the development of civilizations and cultural evolution has had synergistic relations with the natural biological world.

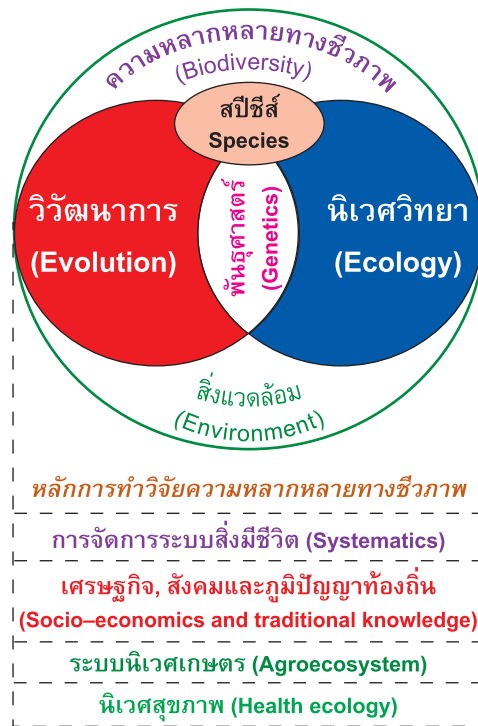


Figure 1 Biodiversity and evolution

The natural world of biological diversity is concentrated in tropical forests and coral reefs, including those that exist in Thailand. Thailand is a relatively small country with a total area of about 513,000 km². Thailand also has long coastlines of some 2,600 km facing the South China Sea to the east and the Andaman Sea on the west side. In the past, 70 percent of the total land area was covered with various kinds of tropical forest including broad-leaved evergreen, dry dipterocarp and pine forest, mixed deciduous forest, peat swamp forest and mangrove forest along coastlines (Figure 2). About 1/3 of the coastal areas are bordered by mangrove forests. These variations of forest type provide terrestrial and aquatic habitats for numerous life forms in complex ecosystems (Figure 3). Thailand's tropical forests support some 12,000 species of vascular plants, roughly 15,000 known species of animals and about 10,000 known species of microorganisms. It is believed that more than 100,000 species of living organisms in these forests await discovery. Thus Thailand is situated in one of the richest areas of the world with regard to biological resources.



Figure 2 Different types of forest in Thailand



Figure 3 Flora and fauna of Thailand



This tremendous variety of living things has long been and continues to be an essential resource for human survival. Thai people directly use microbes, fungi, plants and animals in their surroundings as sources of agricultural products, traditional medicines, clothing, housing and tools, and many other species are used indirectly as sources of pets, recreation, ecotourism and essential ecological services. “Ecological services” include the benefits often taken for granted: water in the atmosphere, rivers and ground, soils, recycling of our wastes, and protection from the extremes of climate. The development of civilizations and cultural evolution has had a synergistic relation with the natural biological world that has long been taken for granted.

Thai society depends on an enormous variety of vegetables, spices, fruits and flowers occurring naturally or in cultivated fields. Most cultivated fruits and vegetables have close wild relatives which persist in fields and forests. Thai food includes a wide variety of dishes which are particularly healthy because of the variety of herbs and spices they contain. Thai cuisine, in fact, ranks among the world’s greatest culinary achievements. This cuisine proclaims artistic creativity, variety and bold tastes besides its benefits to health. It is based on the ingenious use of native biodiversity.

Wild plants of agriculturally important species contain the genetic resources needed to breed crops for resistance to pests and pathogens. Varieties of rice, for example, have been developed to be grown for floating farming, in paddy farming and in dry conditions in the highlands (Figure 4). A number of local species of



Figure 4 Activities in rice field in Thailand



vegetables and tropical fruits, for example, lemon grass, chilli, mangoes and sugar cane, have been used by local people throughout Thai history and have become associated with the traditional lifestyle. In addition, natural products from many species of plants have been used as pesticides. Crude extract from the kernel of *Azadirachta indica* A. Juss. var. *siamensis* Valetton (Thai neem) contains azadirachtin (triterpenoid group) which has been used as an effective pesticide against many species of agricultural pests including cockroaches, locusts, fleas, ticks and plant hoppers.

The people of Thailand have used herbs and medicinal plants as sources of drugs for traditional remedies of ailments throughout this country's long history. Hence, ethnomedicine has developed and has evolved, tested through time, into the intricate art of folk medicine. Such indigenous knowledge has been perpetuated by being passed down from generation to generation within ethnic tribes. For instance, *Curcuma longa* Linn., has been used for treatment of peptic ulcer and dyspepsia, *Diospyros mollis* Griff., has been used to eliminate hookworm and *Clinacanthus nutans* Lindau, is used for treatment of burns, eczema and herpes simplex. The best known example is *Croton sublyratus* Kurz (Family Euphorbiaceae) which has been used by local people for a long time as an effective treatment for peptic ulcer.

Descriptions written on palm leaves concerning herb usage in folk medicine (Samud Khoi, in Thai), by various ethnic groups, is evidence that the ancestral inhabitants of this region had developed their own systems of traditional medicine long ago. These ancient descriptions of folk medicine are very valuable documents detailing the development of traditional Thai medicine and Thai medicinal plants.

The Thai people lived peacefully and sustainably surrounded by the balanced and green environment, for over 400 years, until the 1960s when the Thai government launched its first National Economic and Social Development Plan. As a consequence of this series of national development plans implemented during the past 50 years, Thailand has lost biodiversity and bioresources at an alarming rate. Tropical forests have decreased sharply from 70 percent to only about 25 percent now. The mangrove and peat swamp forests have diminished more dramatically. The rivers and estuaries of the country are suffering even more damage, as a result of upland deforestation, industrial pollution, dams, dredging, canalization and shoreline obliteration. Rivers are extremely rich in fishes and invertebrates, but they are common, multiple use environments and no one takes responsibility for managing or conserving their biota.

The widespread reduction of terrestrial and aquatic habitats for all life forms is inevitably leading to tremendous loss of biodiversity, and many species have suffered



due to stochastic as well as human-caused changes in the natural environment. Many species have become endangered and some are “critical”, that is, in imminent danger of extinction if action is not taken to save them. Many examples are known among the birds of Thailand, which are perhaps the best known components of our biodiversity. Recent records show that among the 946 known species of birds found in Thailand, 7 species have become extinct, 37 species are critical, 69 species are endangered and 248 species are vulnerable). Other species of animals are also facing a similar fate due to loss of habitats by deforestation and other human activities such as clear-cutting and unregulated logging as well as hunting for food and for trade.

An abundant diversity of microbes, fungi and slime molds, and lichens has recently been discovered from forests in different parts of Thailand, but by far the greatest number remain to be discovered. Systematic studies and bioprospecting assays of these bioresources are currently underway in the laboratories of the National Center for Genetic Engineering and Biotechnology (BIOTEC).

Access to these bioresources basically depends upon scientific knowledge in tropical biology, which in turn can be used as guidelines for selecting the most promising species and sites for bioprospecting. However, the most fundamental and pressing questions about our biodiversity deal with systematics and taxonomy. How many species of plants, animals and microorganisms exist in different ecological settings in Thailand? How are they related? Where do they occur? What microbes and fungi are essential for ecological services such as maintaining soil fertility? These questions must be addressed for a better understanding of our biological diversity and the way to protect and manage it.

Until recently, there has been very little support for these kinds of basic research from the government of Thailand. Systematics and taxonomy, population biology, genetics and ecology, as well as biological surveys and species inventories, have long been neglected. Thus, researchers in these fields had to find their own financial support from funding agencies outside the country. This was not always an easy task for junior or even some senior biologists. Now the situation is changing, partly due to the environmental awareness of the Thai people, and the impact of the Earth Summit, particularly the Convention on Biological Diversity (CBD), in Rio de Janeiro, Brazil, in June 1992. Thai people have also become increasingly aware of the significance of ecological services. That awareness usually arose following disasters such as landslides, drought, severe flooding, salinization, loss of riverine fishes, etc., resulting from unwise development. Academic and industrial researchers also have become more aware of the economic importance of biological diversity



which serves as all genetic resource for agricultural crops, pharmaceutical products, and for new approaches in biotechnology as well as valuable sources of traditional medicine.

It has become clear in these endeavors that lack of knowledge of the taxonomy, distribution and ecology of native species will continue to be a major impediment to the discovery and development of useful animals, plants, and microorganisms, particularly those living in tropical forests. Realizing these problems, the Biodiversity Research and Training Program (BRT) was established in 1995 under the sponsorship of the Thailand Research Fund (TRF) and the National Center for Genetic Engineering and Biotechnology (BIOTEC). The major objective of the BRT program is to promote research on and conservation and sustainable use of bioresources. An initial impetus for the establishment of the program was the despair of the nation's leading natural product and chemistry researchers at not being able to properly identify botanical and microbial subjects of research, and the slow progress of inventory of the nation's fauna, flora and microbes. There was also considerable concern that potentially important biodiversity resources vital to the nation's economic well-being were not being well managed and protected. The BRT provides funding for researchers and graduate students in seven major program areas: systematics, population biology, ecology and evolution, socio-economics and traditional knowledge, data management, utilization of bioresources, and policy for biodiversity management and conservation. The BRT has promoted multidisciplinary research with emphasis on taxon-based, area-based, issue-based, and user-based projects.

The BRT has become the nation's main source of support for ecological and evolutionary research. The impacts of these projects on the nation are quite impressive when evaluated by a number of criteria, including publications of scientific papers and books and of magazines for general audiences for public awareness of bioresources, the numbers of graduate students trained, improvement of university graduate programs, new species described, etc. The BRT Program is now at the 15-year mark with a total budget of about 600 million baht. With such obvious indicators of success, it is expected that the BRT will become a major part of a new National Center for Biodiversity Research and Training to be established in the near future.



References

- Abhabhirama A, Phantumvanit D, Elkington J, Ingkasuwan P, 1987. *Thailand Natural Resources Profile*. Thailand Development Research Institute, Bangkok.
- Thailand Country Study on Biodiversity*, 1992. Ministry of Science, Technology and Environment, Bangkok.
- Anderson EF, 1993. *Plants and People of the Golden Triangle: Ethnobotany of the Hill Tribes of Northern Thailand*. Silkworm Books, Chiang Mai, Thailand.
- Graham M, Round PD, 1994. *Thailand's Vanishing Flora and Fauna*. Finance One Public Co., Ltd., Bangkok.
- Kriengkraipetch S, 1989. Thai folk beliefs about animals and plants and attitudes toward nature. In: *Culture and Environment in Thailand, a Symposium of the Siam Society*, p. 195-211. The Siam Society, Bangkok.
- Lekagul B, Round PD, 1991. *A Guide to the Birds of Thailand*. Darnsutha Press, Bangkok.
- Saralamp P, Temsiririrkkul R, Chuakul W, Riewpaiboon A, Prathanturarug S, Suthisisang C, Pongcharoensuk P (eds.), 1996. *Medicinal Plants in Siri Ruckhachati Garden*. Amarin Printing and Publishing Public Co., Ltd., Bangkok.
- Smitinand T, Santisuk T, 1981. The spices and essential oil crops of Thailand. *Nat. Hist. Bull. Siam Soc.* 29: 85-120.
- Treesucon U, Round PD, 1990. Report on threatened birds in Thailand. *Tiger Paper* 17: 1-9.



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