

# GAS export: How prudent is the move?

AFTAB ALAM KHAN

SIX international oil companies (IOC) namely ARCO, Union Oil, Ashland, CSO, BODC and Inaflatin entered into production sharing contract (PSC) within nearly entire off-shore region of Bangladesh for "petroleum" exploration in 1974. "Petroleum" means any naturally occurring hydrocarbon, whether liquid, gaseous or solid state as defined in "The Bangladesh Petroleum Act, 1974". Till 1971, 22 exploration wells were drilled, of which eight gas fields were discovered, all on-shore, having total recoverable gas reserve of 10,204 TCF (trillion cubic feet). Even then, the participation of IOCs was welcomed to help boost and recover country's shattered economy of the post-independence phase through more electricity, more fertilizer and industrial productions. The decision of leasing out off-shore blocks only, was also right in view of the fact that the off-shore exploration is a high tech and costly venture which IOCs were believed to be capable of. Simultaneously, the on-shore exploration would be taken care of by the national enterprise. But the winding up of all the IOCs in 1977 was an indication of much less petroleum prospect for the Bengal Basin.

To expedite petroleum exploration, World Bank assisted Petroleum Exploration Promotion Project (PEPP) was undertaken in 1984 and a new Model Production Sharing Contract was formulated in 1988. In 1989, the entire country was divided into 23 blocks, of which, 19 blocks including six off-shore blocks were offered to the IOCs for competitive bidding. With the passage of time, 1988 model PSC was followed and out of 23 blocks eight blocks in the first round bidding were given to the IOCs in 1994 and some of the rest most prospective blocks were leased out during 2000-2001 in the second round bidding. During 1991-1996 five blocks and during 1996-2001 six blocks were given to IOCs and PSC was signed. This is a very brief historical scenario of petroleum exploration in Bangladesh.

The entire country and its most essential and indispensable national resource, in the process, have gone under the grip of some vested interest groups. Indiscriminate leasing out of entire prospective blocks has resulted in an empty hand for BAPEX, the only national petroleum agency in spite of gas discovery of 2.2TCF by its own technology, manpower and resource. It is not understood what was so big a hurry for leasing out all the prospective on-shore blocks when there was no such great demand of gas that hindered or halted country's industrial, energy and economic development? This hasty move, and by the blessings of liberal and less transparent PSC, has resulted gas production in excess of immediate demand. Subsequently the end result was to

stop production from Petrobangla's operated fields and to buy gas from IOCs at more than double the price and that too in foreign currency. Whereas just before finding new discovery (only Shangu), Petrobangla's 800 MCFD (million cubic feet per day) gas production was more than enough for capacity electricity generation of 2400 MW (mega watt). Even the present day 2800 MW electricity generation would have been possible by much less than the same production of 800MCFD.

**Gas discovery:** How much gas has been discovered since leasing out blocks to IOCs in the last ten years? It is only Shangu in the off-shore having recoverable reserve of 0.848TCF only and Bibiyana in the on-shore having recoverable reserve 2.2TCF (?). Coincidentally, the Bibiyana petroleum prospect was hinted by local geologist back in 1992 (Refer, VIII Geological Conference, BGS Abstract Volume, page 9) but never given any attention! Jalalabad gas discovery (re-

coverable reserve 0.9TCF) was made jointly by Petrobangla and Scimitar in 1989 but UNOCAL is deriving full benefit with cost recovery. Occidental, (currently handed over all its shares to UNOCAL) made a futile gas discovery effort where Magurchara blowout took place damaging about US\$500 million in gas price and destroying entire gas reservoir and causing a huge environmental degradation worth about US\$150 million. No doubt it was a catastrophic failure for Occidental Company certainly liable to entire compensation. It is said that about US\$55 million only (out of about US\$650 million damage) has been paid as compensation. The blow-out report has never been made public in spite of the request and demand from Parliamentary Standing Committee, Shabajpur was discovered solely by BAPEX with recoverable reserve of 0.333TCF. The present crisis on country's gas issue is only due to indiscriminate leasing out of on-shore blocks either of total ignorance or to serve petty interest. When article 143(1) of our constitution proclaims that the people of the republic are the owners of all the natural resources then the people of the republic have all the democratic rights of not being victimized by any decision that would deprive them from getting benefit of its resources.

**How much Bangladesh will earn by exporting gas? Revenue earnings of US\$3.7 billion means US\$1 profit per unit of gas (1000cft) on selling price. The cost of per unit gas export to Delhi will be US\$4.07 that includes wellhead cost and tariffs. So, Delhi has to buy per unit gas at US\$5.07. It seems India would buy gas at maximum US\$4 per unit. If it is so, then there will be US\$ 0.07 deficit per unit on export cost alone.**

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**Gas reserve (not resource):** How much gas reserve actually do we have or, can we afford to export gas? It is beyond any further doubt and above all fairy tales that at

present the country is left with 11.04TCF recoverable gas reserve including Bibiyana (2.2TCF?). The current rate of per day gas consumption of 1050MCFD will exhaust all this reserve by the year 2025 if at all no further daily consumption rate is increased for further electricity, fertilizer and other industrial and domestic use. If Bibiyana reserve is excluded then the current reserve will last only up to the year 2020. How much gas reserve do we expect to have in future? Bangladesh has total 72 structures both exposed and hidden those are potential for gas resource only, and is not by any means "reserve". Altogether, 35 structures have been drilled so far for 70 wells. The recoverable reserve is 11.04TCF (2.2TCF) and after consumption till June 2000, the present recoverable reserve remains only 11.04TCF including Bibiyana (2.2TCF?). The undrilled 35 structures with a very high risk factor (0.8) and optimistic recovery factor (0.6) may contribute another maximum recoverable reserve of 7TCF to the present 11.04TCF. So it is very clear that maximum 18.04TCF gas will be available for electricity, fertilizer and industrial development and household use of Bangladesh if we can restrain from exporting.

**National future requirement:** At present only 17 per cent of the total population is getting benefit of electricity. If we want to provide the benefit of electricity to all the people of the country then we must have recoverable gas reserve to the tune of 15TCF for immediate electricity generation for only 10 years time. A detailed future gas demand calculation upto 2050 has been reported by various national agencies like BPDB, IPPs, Fertilizer Factories and other private sectors that amounts to recoverable gas reserve to the tune of 63TCF (The Daily Star, October 31, 2001). Bangladesh Power Development Board (BPDB) alone has declared its projected gas demand upto year 2020 of 7.8TCF. This will generate only 4274MW electricity daily. The government has already taken decision for implementing electricity production of 3959MW upto the year 2007 only. Even if we want to survive upto 2030 the recoverable gas reserve must be about 38TCF. Do IOCs have any mechanism or technology to testify such unthinkable recoverable gas reserve without going into detailed in-depth study and exploration for a region like "Bengal Basin"!

**Gas export:** How much Bangladesh will earn by exporting gas? First let us do the calculations with regard

to the proposed 'Bangladesh Natural Gas Pipeline Project' upto Delhi from Sylhet: 1363Km long, 30inches diameter, 800psi and 500MCFD for 20 years will require 3.7TCF of gas. Bibiyana has recoverable gas reserve of 2.2TCF (?). Where from UNOCAL would meet another 1.5TCF? Does UNOCAL have any other discovery in block 12? UNOCAL has shown US\$3.7 billion national revenue earning in 20 years time by exporting gas. However, the following calculations signify for highly gloomy and frustrating scenario. In 20 years time at the rate of 500MCFD gas export (if it does not increase with years to come) will consume 3.7TCF. Revenue earnings of US\$3.7 billion means US\$1 profit per unit of gas (1000cft) on selling price. The cost of per unit gas export to Delhi will be US\$4.07 that includes wellhead cost and tariffs. So, Delhi has to buy per unit gas at US\$5.07. It seems India would buy gas at maximum US\$4 per unit. If it is so, then there will be US\$ 0.07

deficit per unit on export cost alone. The question of US\$1 per unit profit is absolutely a dream. This will lead to our revenue deficit of US\$259 million in 20 years time. In addition, UNOCAL will take possibly around US\$150 million (?) as cost recovery and US\$1200 million for pipeline cost. Adding all, Bangladesh will be indebted to UNOCAL by about US\$1609 million by exporting gas for the projected time and at rate. Obviously, this amount cannot be paid in cash rather has to be in kind. US\$1609 million is equivalent to 0.4TCF gas at international price. Hence net depletion of gas reserve of the country will be by 4.1TCF (3.7TCF + 0.4TCF) from our present recoverable gas reserve. It goes now with our saying that by exporting gas we are going to lose 3.7TCF gas and US\$1609 million. So the question of revenue earning of US\$3.7 billion as stated by UNOCAL by exporting gas in 20 years time appears to be simple an eye wash.

**Indebtedness to IOCs:** Since the signing of PSC with IOCs in Bangladesh for petroleum exploration, how much indebted is Bangladesh to IOCs till today? We should consider only the blocks those have been leased out to UNOCAL and Cairn with Shell for calculation because gas discovery has only been at Bibiyana (2.2TCF?) and Shangu (0.848TCF) by them, respectively. Other IOCs have conducted seismic and other necessary surveys only and any success is yet to come. According to PSC, IOCs will bear all the expenses till discovery, if any, and would

realize entire money expended in the process as "Cost Recovery" if discovery were made. In addition, the recoverable reserve would be shared at 70 per cent for Bangladesh and 30 per cent for IOC discovering the reserve. So, 30 per cent of 2.2TCF equal to 0.66TCF would cost US\$1.8 billion for Bibiyana and 30 per cent of 0.848TCF equal to 0.26TCF would cost US\$0.69 billion for Shangu in international price. Cairn has claimed US\$290 million as "Cost Recovery" from Shangu field block which was initially US\$88 million, jumped to US\$190 million immediately after Shangu discovery and finally to US\$290 million. Similarly, UNOCAL has also claim from Bibiyana field block for "Cost Recovery" which should not be more than US\$100 million to US\$150 million. Since Jalalabad field is ready made one to UNOCAL, there should not be any claim for "Cost Recovery". Even, 70 per cent and 30 per cent ownership share of the gas production from Jalalabad field should not be applicable to UNOCAL. In addition, there exist claims for "Cost Recovery" by other IOCs who have already expended money in exploration activities. The amount, however, should not be as large as Shangu. But summing up all the above amounts in figures, the total indebtedness, (if all the PSC are withdrawn immediately), to IOCs stands at maximum US\$3.22 billion adding "Cost Recovery" factor US\$150 million for UNOCAL, US\$290 million for Cairn-Shell and US\$290 million for all other IOCs. However, summing only the "Cost Recovery" amounts for all the IOCs, the immediate total indebtedness amounts to US\$730 million. Another indebtedness due to purchase of gas from IOCs at international price amounts to US\$91 million. Thus, an immediate total indebtedness rises up to US\$821 million. How much has already been paid is not known.

**Options and suggestions:** As an individual, I can only suggest for some options, which may save country's economy and people from seemingly gloomy prospect arising out of the current "Gas Export" issue.

a. Plan and implement immediate massive power (electricity) generation and industrial growth infrastructures for the maximum consumption of present gas production and assign profit share to IOCs for recovering debts.

b. Stop all new production of gas until current producible gas is ensured for local consumption.

c. Cancel all new PSCs where the activities have not yet been started. PSC may be signed only for exploration to help increase our much talked of recoverable gas reserve which may create a future possibility for exporting gas.

e. The present form of PSC for total petroleum exploration may be applicable for the off-shore region only.

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## In memoriam

# Fakhruddin Ahmed: Profile of a friend

SHAH AMS KIBRIA

MY friend Fakhruddin Ahmed is no more. He passed away on 2 November while under treatment in the United States. A distinguished diplomat, a dedicated public servant and above all a fearless patriot, Fakhruddin's demise has caused a void in our national life, which will be difficult to fill. For me personally it is a loss that is almost unbearable.

My association with Fakhruddin began in 1954 when we both joined the Pakistan Foreign Service. As a student of the Dhaka University I was in the Economics Department while he was in the Department of International Relations. He was a year senior to me in the University and perhaps that was the reason that I did not meet him earlier. I first met him in Boston at the Fletcher School of Law and Diplomacy where we both went to study as part of our training for the diplomatic service. We were six of us, three Bengalis, two Punjabis and one Behari in the 1954 batch of the Pakistan Foreign Service probationers. Instinctively perhaps the Bengalis were drawn close together and thus started my friendship with Fakhruddin which survived more than four turbulent decades.

Quiet, unassuming and dignified, Fakhruddin was every bit a diplomat. Warm in his relation with friends, he was helpful to all. He always had a sweet smile on his face and a helpful advice when sought. A gentleman, whose unflinching courtesy and consideration for others made him a man who easily earned the respect of all those who came into his contact. He served at home and abroad in different capacities but always with distinction. We were together in New York in the early sixties -- he was vice-consul in the consulate general and I was posted in the Pakistan mission to the UN. Those were happy days indeed. Fakhruddin was still a bachelor and his penthouse apartment in the consulate premises was a favourite meeting place for many of his friends. We spent many long winter evenings talking. I recall spending hours talking about Bangladesh. When heavy snows kept us confined, we sat together listening to Bengali music -- mostly Tagore songs -- and dreamed about the future. The number of Bengali officers in the Pakistani missions abroad in those days was so small that the cultural environment for us was often alien and even hostile. Pakistan meant West Pakistan and perhaps those of us who served

abroad felt the discrimination more sharply than those who lived at home. We were together once again in Islamabad in the late sixties when we were both Directors in the Ministry of Foreign Affairs.

By then the emotional and intellectual split between the Bengali and non-Bengali officers was almost complete. Bengali officers in Islamabad had a separate society of their own and their social and cultural life was quite separate from those from West Pakistan. Fakhruddin and I lived in the same area and spent a lot of time together. His son Mishu and my daughter Nazli were about the same age and they went to the same school. We occasionally played bridge but we also talked about politics. The political out-



lines of our future were already emerging and for most of us an independent Bangladesh was inevitable. Of course we did not know when and how our dream would become a reality but Fakhr and I shared a similar view about the nature of the fast unfolding events. Both of us had confidence about the leadership of Bangabandhu Sheikh Mujibur Rahman. Our group in Islamabad had, apart from Fakhruddin and myself, Enayet Karim, Tabarak Hussain, Faruk Ahmed Chowdhury, A W Shamsul Alam, Ataul Karim, Kaiser Morshed and a number of others who subsequently left their mark in the diplomatic history of Bangladesh. One can see in retrospect that the discussions we had in Islamabad was in fact an emotional preparation for the decision that many of us took in 1971 during the Liberation War.

In 1971 Fakhruddin was unfortunately stranded in Karachi on his way to Dhaka where he was posted. Eventually he fled with his family via Afghanistan to return to Bangladesh in January 1973. By then I had left Dhaka for Australia as High Commissioner. He joined the Ministry as Additional Foreign Secretary and was appointed

Acting Foreign Secretary when Enayet Karim prematurely died of a sudden heart attack. Thus Fakhruddin had the honour of serving directly under the guidance of Bangabandhu Sheikh Mujibur Rahman. This was the formative period of our growing external relations and Fakhruddin played an important role in the development of these relations. His autobiography "Critical Times: Memoirs of a South Asian Diplomat" is rich in information about these years. Later he served as our ambassador to several important posts including Rome, Belgrade and London. His wife Helen's illness cast a shadow over his life during this period. I was myself serving in Geneva while he was in Rome. I recall with nostalgia the wonderful time we had both in Geneva and Rome. It was an interesting coincidence that he was concurrently accredited to Bern while I was accredited to the Vatican. Despite Helen's illness, which was already taking its toll, her gracious and tireless hospitality always made our visits to Rome most enjoyable. I could clearly see that Fakhruddin was tirelessly working to help the local Bengali community in Rome that was rapidly growing in number. He was equally successful as our High Commissioner in London.

After retirement from the diplomatic service Fakhruddin served, when Ershad fell, as an adviser for foreign affairs in the interim government. I remember it was during this period that I came to Dhaka at his kind invitation to address the officers of the Ministry of Foreign Affairs. Fakhruddin joined the Bangladesh Institute of Law and International Affairs and rendered useful service as its Honorary Director. The independence of this institute was not acceptable to many persons in the government in those days and my friend had a lot of problems in keeping the Institute alive. As a distinguished member of the civil society of Bangladesh, he was often invited to observe and monitor elections in a number of friendly countries. His experience in election monitoring might have been responsible for his election as the chairman of FEMA -- a body created by some NGOs for election monitoring in Bangladesh. Fakhruddin's presence in FEMA as its chairman gave it a credibility, which has not, much to our disappointment, survived after he left it. Indeed we keenly felt the absence of this man of impeccable integrity. We all miss him. A gem of a human being, Mr Fakhruddin's outstanding service to the nation will be long remembered.

# War on terror - my cow

AZAZ AMIR

"BRUTE force bereft of reason falls by its own weight. Power with counsel temper'd even the gods make greater; but might which in its soul is bent on all impiety, they hate." Horace. If this was a war on terror then it should have begun from Israel, the dagger of terror planted in the heart of the Arab world and held in place by help from the United States. But since it is nothing of the kind and from New York's Twin Towers, or rather their rubble, has leapfrogged straight to Afghanistan - on a body of circumstantial evidence that would fail to convince even a drinking judge of a county court - it becomes valid to question America's strident, and increasingly tiresome, rhetoric and the half-truths it is expecting the rest of the world to swallow.

If this was a war on terror what about the US' own record in this field? What a shining list of scumbags the US has supported in Asia, Africa and Latin America, all in the name of freedom and the fight against communism. The Trujillos, Somozas and Batistas signified the kind of ruler the US was happiest with. No matter how corrupt and tyrannical, they were kosher, and high in American esteem, so long as they played lackey to US interests. The word banana republic comes from the Caribbean and denotes the kind of dependent and compliant state the US favoured. What was Fidel Castro's great crime? Cuba was no threat to the US. The very idea is laughable. The US just could not tolerate a regime 90 miles off its coastline that had the temerity to stand up to it. Havana was a playland and a brothel for America's

rich. Castro put an end to that and took Cuba out of the American orbit, an act of audacity for which the US has never forgiven him. He wasn't even a communist to begin with, but became one as a response to American hostility. What was the Bay of Pigs except an exercise in naked terror? It was an invasion of Cuba by an army of Cuban exiles armed and funded by the CIA. The Reagan administration broke American laws to provide funds and arms to the Contra rebels (or terrorists) it helped put up against the Sandinista government in Nicaragua. This list can go on and on, the overthrow of Mossadegh in Iran, Lumumba's killing in the Congo, the brutalization and naked terror practised by the US in Vietnam, the totally pointless war foisted on Cambodia (from which that country has yet to recover), and training and funding the same Arabs and Muslim fundamentalists in Afghanistan during the eighties whom the US is now attempting to destroy.

Those idealists who consider the US as the land of hope and liberty should consider the US record in Latin America and the Third World before getting wet-eyed on this score. Now we are witnessing another exercise in muscle-flexing in the name of freedom - this time Enduring Freedom. The irony surrounding this venture is thicker than the bombs falling on Afghanistan. Democracy and the rule of law at home should not be confused with unprincipled conduct abroad. European colonialists abided by rules at home which they discarded as soon as they left their shores. So it has been always: one law for Rome, another for the barbarians vanquished by Rome. So it is with the new imperialism: a different light shining from the Statue of Liberty, a

different morality beamed at the outside world.

After 50 years of supporting the politics of terrorism in the Middle East, and of exporting CIA-led terror elsewhere across the globe, the US is aghast with uncontrolled indignation because the unimaginable has occurred and it too has been struck by terrorism.

Like the Cyclops Polyphemus whose eye was taken out by Odysseus, the US is going about like a wounded giant and will not be appeased unless it has had its revenge. But revenge on whom? The trail leading from the Twin Towers to bin Laden is unclear but has been seized upon by the US because it is the only one available. And because bin Laden and the Taliban are easy targets to demonize.

One does not have to be a Taliban supporter to point out the iniquity of what the US is doing. At issue is not what the Taliban stand for or what their attitude to women is but the death and destruction raining down on the hapless people of Afghanistan. Nothing in the world can justify this and those bleeding hearts who underscore the retrogressive nature of the Taliban's policies are only confusing the issue. No such confusion exists in the minds of ordinary Pakistanis. They may have no truck with the Taliban but they do not like the brutal bombing of Afghanistan. They also do not like Pakistan's soil being used as a launching pad for what is increasingly perceived as an unholy war.

Is it not plain to see what is happening in Afghanistan? A humanitarian catastrophe is looming on the horizon but the 'civilized world' whose way of life came under threat on September 11 views different

objects through different spectacles. Afghanistan is not part of the civilized world, or at least of none that a US president who looks smaller than the cosmic roler he is trying to play would readily recognize. So it is all right to apply different standards there. The UN has been a US mistress since the Gulf War. So it is foolish expecting comfort from that quarter. But even the UNHCR and its risible chief, Lubbers of the Netherlands, are playing politics with the plight of the Afghans.

If the suffering is in Afghanistan, then the relief aid should go there. But Lubbers and his entourage think that that would somehow work in the Taliban's favour. So instead of taking aid to the refugees, they are asking Pakistan to open its borders, so that the problem caused by American bombing adds to the refugee burden of Pakistan. With friends like these, who needs enemies? Even so, Pakistan's role is the strangest in this dance of death over the skies of Afghanistan. Even if the doubtful proposition is accepted that we had no choice except to bow to American wishes, what necessity drives us to be more loyal than the king?

While standing by Donald Rumsfeld's side (at the press conference both addressed in Islamabad), Pakistan's foreign minister Abdul Sattar was not content to observe diplomatic niceties. He had to outreach himself and say that never in human history was so much care taken to avoid human casualties as the Americans were taking in Afghanistan. The cadence of Churchillian rhetoric - 'never in the field of human conflict...' etc., -

employed to what dubious purpose. Remember also the haste with which Pakistan said that the evidence provided by the US was enough to indict Osama bin Laden in a court of law. The American bombing came after this bit of judicial activism from Pakistan. Whom were we trying to satisfy? The world or our own scruples?

In a similar category falls General Musharraf's assertion that the Taliban's days were numbered. Granted that we have no freedom of action, or rather, that we have seen to it that we are divested of all freedom of action. Still, why must our behaviour exceed the limits of necessity? But, surely, an image that will linger long in the mind is that of Pakistan's proud military chiefs standing in line with beaming faces to greet Rumsfeld, while General Musharraf is seen laughing a step or two behind. Necessity or weakness may be behind the position we have taken in this crisis. But with the people of Afghanistan being subjected to brutal aggression, what need, in public at least, for such bonhomie? For form's sake, if nothing else, we could be more guarded in our displays of affection when American warlords come calling. Now General Musharraf is on his way to New York to be feted by President Bush on the sidelines of the UN General Assembly session. We can only keep our fingers crossed. It doesn't take much for a Pakistani leader to be swept off his feet. A bit of extra cosseting and someone who in his native setting looks every inch a stern defender of the national interest is changed instantly into a plate of pudding. It is the nation which ends up paying the bill for this transformation.

By arrangement with THE DAWN

# Contraindication of aspirin in dengue haemorrhagic fever

MOHD ABDUR RASHID

DENGUE haemorrhagic fever first "emerged" in 1949, although clinical dengue fever was reported more than 100 years earlier. It is an acute, infectious, tropical viral disease. It is a mosquito-borne infection, which in recent years has become a major international public health concern. Dengue is found in tropical and sub-tropical regions around the world, predominantly in urban and peri-urban areas. Dengue haemorrhagic fever (DHF), a potentially lethal complication, was first recognised in the 1950s and is today a leading cause of childhood mortality in several Asian countries. There are four antigenically distinct, but closely related, viruses which cause dengue e.g. DEN-1, DEN-2, DEN-3, and DEN-4, of the genus Flavivirus.

**Transmission:** Dengue viruses are transmitted to humans through a domestic, day-biting infective female Aedes mosquito (*Aedes aegypti*). The virus circulates in the blood of infected humans for 2-7 days, at approximately the same time as they have fever; Aedes mosquitoes may acquire the virus when they feed on an individual at this time.

**Classification:** There are two types of dengue fever -- 1) classical dengue fever, 2) dengue haemorrhagic fever (DHF).

**Symptoms:** Dengue fever is a severe, flu-like illness that affects infants, young children and adults but rarely causes death. Dengue haemorrhagic fever is a potentially deadly complication that is characterised by high fever, haemorrhagic phenomena often with enlarge-

ment of the liver and in severe cases, circulatory failure. The fever usually continues for 2-7 days and can be as high as 40-41 °C. In severe cases, the patient's condition may suddenly deteriorate after a few days of fever; the temperature drops, followed by signs of circulatory failure, and the patient may rapidly go into a critical state of shock and die within 12-24 hours.

**Treatment:** There is no specific treatment for dengue fever. However, careful clinical management by experienced physicians and nurses frequently save the lives of DHF patients. With appropriate intensive supportive therapy, mortality may be reduced to less than 1 per cent. Maintenance of the circulating fluid volume is the central feature of DHF case management.

**Mechanism of dengue haemorrhagic fever:** The haemorrhagic dengue variant seems to be able to replicate in the human body only in macrophages. It is possible that the virus-antibody interactions actually help haemorrhagic viral replication by promoting cell infection. This is via specific macrophage receptors the Fc portion of the antibody molecule. Apparently, the antibodies attach to the virus's outer envelope, then signal the larger macrophages. When a macrophage responds to the antibody signal and arrives on the viral scene, it engulfs the virus.

**Contraindication of aspirin:** Sune-bergstrom, Bengisauellson and John R Vane who shared Nobel prize in medicine in 1982 first proved that the mechanism of the anti-inflammatory action of aspirin and related non-steroidal anti-inflammatory drugs was directly

due to the inhibitory effect on prostaglandin formation. Aspirin gives an antiplatelet response. But before the response of aspirin in dengue fever, we should know the sequences of event of platelet aggregation as below:

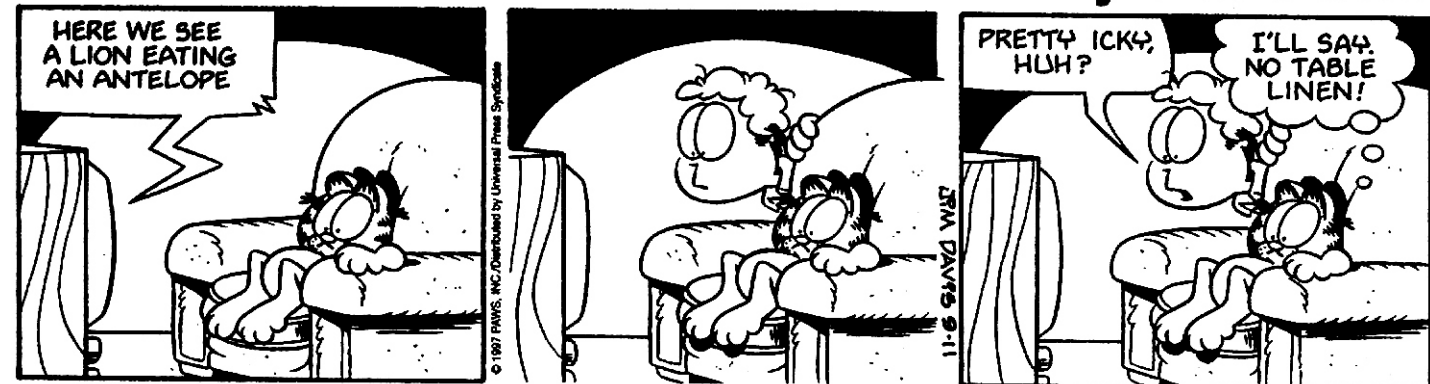
- 1) The platelet adheres to the vessel wall, a process aided by the exposure of the sub endothelial structure such as the basement membrane, collagen and elastic fibre.
- 2) Activation of the biochemical coagulation process is initiated.
- 3) Disruption of the platelets leads to release of their cytoplasm constituents, of which ADP and serotonin from the amine storage granules are believed to be of special importance.
- 4) Released arachidonic acid from the platelets thromboxane<sub>2</sub> (TXA<sub>2</sub>) and endoperoxides accelerate platelet aggregation and thus blood coagulation.

Aspirin irreversibly acetylates and inactivates cyclooxygenase in circulating platelets possibly in megakaryocyte. This inactivation prevents platelet synthesis of prostaglandin endoperoxides and thromboxane A<sub>2</sub> (TXA<sub>2</sub>) compounds that induce platelet aggregation and therefore prolongation of bleeding time.

**Treatment with paracetamol:** Paracetamol is a very weak anti-inflammatory agent and a very weak inhibitor of cyclooxygenase. Paracetamol has no effect on platelets, bleeding time and the excretion of uric acid. In similar doses paracetamol is equivalent to aspirin in analgesic potency and duration of action; however unlike aspirin, it doesn't cause GI or bleeding disorders.

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