

LETTER FROM AMERICA

Bangladeshis Hold the First Arsenic-Poisoning Conference in America

Dr Fakhruddin Ahmed writes from Princeton

Because arsenic is a slow-acting poison, it is not an attention-grabber like a sudden disaster. There is a latency gap in this time bomb. Silently but surely it kills in 15 to 25 years. Unless detected early on, the poisoning is irreversible. 43-98 per cent of the total arsenic is in the most toxic trivalent form.

ON February 27 and 28, Bangladeshi chemists in North America held an International Conference on Arsenic poisoning in Bangladesh, at Wagner College, in the Staten Island borough of New York City. Organized by Bangladesh Chemical and Biological Society of North America (BCBSNA) and Intronic Technology Center, Dhaka, the conference was the brain child of Dr. Mohammad Alauddin, Professor of Chemistry at Wagner College. The conference was dedicated to 25-year-old Tajir Begum of Mirpur in the Pabna district of Bangladesh, who is dying of arsenic-induced cancer. Tajir Begum was featured in a front page article in the *New York Times*, on November 10, 1998.

The who's who among the arsenic-poison experts of the world attended the conference. Epidemiologist Professor Allan Smith, the keynote speaker from University of California, Berkeley, made the trip as did Dr. Dipankar Chakraborti of Jadavpur University, Calcutta, the person responsible for bringing the arsenic-poisoning catastrophe in West Bengal and Bangladesh to the world's attention. There were scientists from America, Canada, Sweden, India and Bangladesh; from US Geological Survey, Massachusetts Institute of Technology (MIT), University of Connecticut, Lehigh, Columbia and Harvard Universities.

Wagner College, a marvelous host, shared the cost of the conference. Dr. Richard Guarasci, the College Provost, organized the conference. The President of Wagner College, Dr. Norman Smith, hosted a reception for the participants at his gorgeous office overlooking the Verrazano Narrows Bridge that spans the boroughs of Staten Island and Brooklyn. (Dr. Kamal Das, President of BCBSNA, thanked the Wagner College President profusely for hosting the conference.) All in attendance were united in their resolve to bridge another gap—that exists between the technological capabilities of Bangladesh and the USA—and

to solve the arsenic poisoning crisis in Bangladesh.

The water that the underground tube wells bring up to the surface is considered a mineral. It contains beneficial elements such as iron, calcium and other nutrients. It can also contain deadly poisons such as arsenic and lead. The real safe level of these poisons in drinking water is zero. That is not obtainable. For safe drinking, the World Health Organization (WHO) recommends no more than 10 parts per billion (ppb) of arsenic in water. Bangladesh adopted a much higher level—50 parts per billion.

The rationale behind Bangladesh's embracing of the higher level of poison is that the USA, where drinking water is not a problem, recommends the same level. That was a mistake. On a given day an average American's liquid intake includes endless cups of coffee, soda (Coca Cola, Pepsi, 7-up), beer and wine. An average Bangladeshi villager drinks water exclusively. And because of the heat, he/she drinks lots of it. And if the water is poisonous, he/she ingests plenty of poison. Therefore, the recommended levels of arsenic in water for Bangladesh should be not higher, but much lower than the level recommended by WHO.

Arsenic is a human carcinogen that quietly accumulates in hair, nail and skin. Common symptoms are depigmentation, rashes on palm and soles of feet. As the poisoning advances, it retards the growth of limbs, resulting in deformities, birth defects and abortions. The natural progression of the poisoning is hyperpigmentation, through keratosis and gangrene, to finally cancer. Skin cancer looks like leprosy. People mistakenly believe that it is infectious. The victims are shunned as social outcasts; men do not get jobs, women are denied husbands. Because arsenic is a slow-acting poison, it is not an attention-grabber like a sudden disaster. There is a latency gap in this time bomb. Silently but surely it kills in 15 to 25 years. Unless detected early on, the poisoning is irreversible.

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Apart from the widely read Chemical & Engineering News reporter Will Lepkowski, the conference was also covered by local vernacular dailies, *India Abroad*, and for the *Voice of America* by Ms. Zakia Khan. Professor Mohammad Alauddin chaired the morning session on the inaugural day. The afternoon session was devoted to analytical methods for the detection of Arsenic in water. The session was chaired by Professor Abul Hussam of George Mason University, who has developed instrumentation of his own for the detection of Arsenic. In his presentation, Dr. Hussam reported on arsenic speciation studies in Bangladesh water, and remarked on the limitations of kit method widely used in Bangladesh for detecting arsenic. At the end of each day, there was a panel discussion on the papers and remedies presented. Drs. Quamrul Ahsan and Shamsuddin Ilias were the co-hosts. All the technical sessions on the second day, dealing with the geological processes and remedial methods, were chaired by the writer.

There are about four million tube wells in Bangladesh, one million of which were dug by UNICEF in the 1970s. It is conservatively estimated that 70 million people are poisoning themselves by drinking water from these fountains of death. In 43 of Bangladesh's 64 districts, the arsenic level is more than 50 ppb; in 20 districts the level is between 500 to 2000 ppb! According to the physicist Willard R. Chappell: "If this were the United States, they'd call out the National Guard and get everyone bottled water. But Bangladesh does not have resources. It may be pointed out that Bangladesh's per capita

income is 266 dollars. Poor nutrition could also be a factor as to who is affected more adversely."

In his presentation, Professor Smith cast some doubt on the role of nutrition in combating poisoning. His study in Argentina showed that Argentinians of European origin, on high protein diet (beef steak), have also been suffering from Arsenic poisoning since the 1930s. The more recent case of Arsenic poisoning in Taiwan was very well known. Yet, in his talk, Mr. Gourishankar Ghosh, Chief, Water and sanitation Division, UNICEF, said that amidst their enthusiasm to drill tube wells in Bangladesh in the 1970s, UNICEF forgot about the Taiwan experience. The deadly water went untested for two decades! Mr. Ghosh believes that emphasis should now be on saving children. Dr. Bibudendra Sarkar, an expert on metal-related diseases from the University of Toronto, showed a video of the victims from a recent visit to Bangladesh, that brought tears into every eye in the audience.

Dr. Dipankar Chakraborti believes that what is known about arsenic poisoning in Bangladesh is only the tip of the iceberg. Where Bangladesh is failing is in the management of the problem, he says. In remote villages, people do not know that they are arsenic patients. In one village in Jamalpur, 80 per cent of the people suffer from arsenic poisoning. The bad news is that it is estimated that only 33 per cent of tube wells in Bangladesh are safe. The good news is that there is not a single village in Bangladesh where all the tube wells are unsafe.

Bangladesh is a land of rivers, wetland lakes, there are over 11,000 cubic meters of

fresh water for every person. Yet, there is excessive use of ground water for irrigation (80 per cent), drinking and cooking (10 per cent). More, or deeper tube wells is not the answer. 100-200 ft tube wells can be the most contaminated. Luckily, the food chain has not been contaminated.

Dr. Alan Welch of US Geological Survey showed how arsenic can be released from iron oxide through an increase in pH. Dr. Muhammad A. Miah of the University of Arkansas wondered whether Farakka Barrage had something to do with the arsenic contamination in Bangladesh. Dr. Shitosh Roy reiterated the effort expended by Dhaka Community Hospital in analyzing hair, nail and urine samples to establish the magnitude of arsenic poisoning in Bangladesh. Dr. Stute of Columbia University presented their data on how Arsenic is mobilized in sediments and transported by ground water. Dr. Prosun Bhattacharya of Royal Institute of Technology, Sweden, reminded everyone that arsenic, the 20th most abundant element in the earth's crust, is not a 'contamination'; it is a natural occurrence.

Dr. Timir Hore was concerned about the faulty construction of tube wells in Bangladesh. Good construction should be double checked to avoid vertical seepage from upper to lower aquifer. He explained why the two tube wells separated by 10 feet, one can be contaminated and the other safe, and how faulty construction can result in bacterial contamination of groundwater. He suggested that contaminated tube wells be sealed, not just painted red. Ms. Susan Murcott of MIT summarized the remedial methods currently available, as well as her experience with

fresh water harvesting in Myanmar.

Dr. Mohammad Alauddin summarized the analytical techniques currently in use and recommended ways of handling massive number of samples. Analysis of water from 15 locations in Dhaka city in his laboratory showed an arsenic level of less than 3 ppb. Dr. Arup Sengupta of Lehigh University discussed a water purification system, in operation in India, capable of providing arsenic-free water to at least 400 families for 10 years (Cost: \$1500 per unit); he was willing to split the cost of the first unit in Bangladesh. Dr. Alauddin volunteered to install the first unit in Bangladesh, at his own cost. Dr. Dalijur Rahman presented analysis of water collected from four tube wells in Dhamrai, out of which one was exceedingly pure! (He was advised to put a fence around the well and commercialize the water!) Finally, Dr. A. H. Khan of Dhaka University Chemistry Department presented data on arsenic water collected from Noakhali, Sitakum and Cunitagong. He answered questions on the current thinking in Bangladesh on this life and death issue.

Now that the problem has been enunciated, what is the solution? The best solution is not to attempt to 'purify' poisonous water, but to move away from it altogether to 'purified' surface water. Every claim of filters that make arsenic disappear, must be regarded with skepticism. It's not that simple. Emphasis should be on 'safe' drinking water, not merely Arsenic-free water. The affected population must be urged to drink water from safe tube wells. IMMEDIATELY! These must be monitored regularly. The non-safe ones should be sealed off permanently. There is a saying that, 'Pani bashi khabo', if you have to, drink aged water. Let water age in a kalshi; some harmful minerals may be absorbed. Filtration through 0.1 micron filters also helps. Arsenic waste can be placed in cow dung, where it will be methylated, according to reports.

Arsenic hospitals must be set up for the victims! Most importantly, over-dependence on ground water must be ended. Efforts must be made to tap other sources of water, such as harvesting of rain water (bacterial contamination is an easily overcome problem), which are practiced by our neighbours in Myanmar and Thailand. Low-cost water treatment plants to purify surface water must be considered seriously. Bangladesh must terminate its master-servant relation with UNICEF and WHO, and rely more on its own

scientists. Ironies abound in this tragedy. Switch from surface to underground water was a jump in technology. Alas, technology is not always benign. In a country of 'water' everywhere, there is 'not a drop to drink!' This writer was touched by the depth of the warmth and goodwill for Bangladesh exhibited by non-Bangladeshis attending the conference. MIT's Ms. Susan Murcott broke down as she described the suffering of the people. That goodwill must be harnessed for the good of Bangladeshis villagers. Drs. Dipankar Chakraborti, Bibudendra Sarkar and Timir Hore were all born in Bangladesh.

There was genuine disappointment with Bangladesh government's inadequate response to the catastrophe. Arsenic-poisoned Bangladeshis write to Dr. Dipankar Chakraborti for help, not their own government! The first case of arsenic poisoning in West Bengal was reported in the *Daili* in 1983. Bangladesh government was informed of arsenic poisoning in its ground water in 1992; but was very slow to act. Since Dhaka was not affected (I am not convinced of that) the government sat tight. The patriotic Bangladeshi expatriate community in North America is willing, eager and desperate to aid their fellow country folks in their hour of need. The question is: will the Bangladesh government let them, or stand in the way?

Mustafizur Rahman as I Knew Him

By Barrister Harun ur Rashid

It is with great sadness that I write a few words about Forgiven Secretary Mustafizur Rahman who is no more with us. He was my colleague in the Foreign Office. While I met with him in late December last year he looked to me in good health and little did I realise that I shall not be able to see him again. He was polite and courteous as always and was happy to see me after several years.

I heard Mustafiz's name for the first time in 1971 as he was one of the courageous diplomats who gave away diplomatic privileges to serve the cause of the Bengali people. During the Liberation war in 1971 Mustafiz played a key role for Bangladesh while he was posted in Kathmandu as a junior diplomat in Pakistan Embassy. He was so appalled with the atrocities of the then Pakistan military regime on the innocent Bengali people, that he could not stomach the brutality and switched his allegiance from Pakistan to unborn Bangladesh and worked actively for the independence. This decision of Mustafiz demonstrated his total commitment towards the welfare of the Bengali people.

First I met him in 1974 in Dhaka Foreign Office. Over the years I had the privilege of knowing him and I had the satisfaction of observing him work at a close range. We were together in mid 70s and then in

1987 in the Foreign Office. I hardly saw his feathers ruffled even under pressure. He was quiet but confident a person. He had a deep voice which attracted attention at the meetings.

Mustafiz was able to identify the core issue in a given matter and quick in the disposal of matters entrusted with him. In my view the purpose was more important to him than process. He was committed to public service in the broadest sense of the term. He had a picture of the kind of Bangladesh he wanted to contribute to and he worked in pursuit of what he believed. Mustafiz occupied the highest position as a career diplomat after having served as

Bangladesh Ambassador to Russia and China. While we were posted overseas, we met several times in a third country. In 1982 on my way to Australia, I stopped at Kuala Lumpur with Mustafiz who was High Commissioner to Malaysia. In 1985 he came for a visit to Manila with his wife Suraiya and lived with us while I was posted in the Philippines. Again while I was returning to Dhaka Foreign Office from Manila, I stopped in Rangoon and Mustafiz received me at the Rangoon airport. It may be mentioned that my wife and Suraiya were together teachers at the Green Herald School during mid 70s. Our children became closer to Mustafiz's family.

I wish to comment on the splendid diversity of his interests and contribution. He started with a career in Airforce and ended up as a seasoned diplomat joining Pakistan Foreign Service in 1964. He was a person with great love of art and music. He played violin during his leisure time.

It is a great tragedy that he should have left us at an age of only 57. He was a Bengali first, last and always. Let me end with the lines that Horatio spoke on the death of Hamlet: Now cracks a noble heart. Good-night, sweet prince. And flights of angels sing thee to thy rest.



Late Mustafizur Rahman

In Memoriam

An Officer in the Ministry of Foreign Affairs

For obvious reason I declined to be named. But a certain event that I have observed as an officer in the Ministry of Foreign Affairs, I find it too irresistible to keep from sharing with other readers. It happened recently. A two-year contract for the outgoing Foreign Secretary.

There had already been so much speculation on the appointment of a new Foreign Secretary. There almost ran a competition among the diplomatic correspondents and political analysts to first dig out the confidential move by the government. They analysed, judged and ascertained the principal candidate and the alternate candidate. From their choice of good places(!) the UK and the USA.

In one hazy languor of an October afternoon the despatchman delivered a circular on my desk at work. I grabbed it perfunctorily as we do mostly the government circulars. My good God, the government has extended the tenure of the Foreign Secretary! I straightened my back and sat tightly on my chair.

I am basically not in favour of such extensions. It might turn boomerang for me! My turn of becoming the Head of any office could be badly affected. Undeserving people will try if have already seen them doing their utmost to deprive the deserving of their due credits. Who would not like to leave their children saying proudly—'yes, my father retired as Secretary/DG'. Instead of faltering 'Yeh, he was AFSD/DDG'.

But this time I experienced myself a new feeling. I felt relieved and not discontent at least. Gradually I began thinking and analysing in order to have a critical appreciation how justified the government's decision was (where else on earth people look for justification in government's decision!) in putting a man on contract again. The contract person is to be working under duress giving lacklustre performance. Although there comes a very few exceptions, depending on the individuals.

It's better than the speculated new appointment—heard myself saying. The unfair lobbying and flat sycophancy by some of them, as were being speculated, was already in the air and also evident. This is quite reflective of their personality. Competence may be a common aspect but INTEGRITY is truly a rare thing among our senior officials. Perhaps there has been a single instance in the extension of service of a secretary that there came no reaction or any repercussion either. It is our Foreign Secretary Mustafizur Rahman's. Suffice it to say his contributing factors are, apart from his professional competence—his being soft-spoken yet firm, his calm disposition and forbearance in place of sycophancy (a common trait in many others) and vengeance, his pleasant personality and above all that matters, his integrity. His being Foreign Secretary was due earlier but he was deprived of it. Despite that fact, he was not re-

ported to have shown any resentment or have gone for any lobbying. It could be because of his habit of writing he is susceptible in nature. Otherwise being a pro-liberation force and a translator of Ekattur Dingu he could have duly taken advantage or exploited his plus point in turning to be an astute person. It should stand as an example for other aspiring officials.

The present government is already disappointed and not happy with the performance of some of the persons put to the top of some offices on contract basis. These people are seen as barely deserving but they leave no stone unturned to attain their goals which are too high for them. It is a good sign and we feel relieved that the government now realises to take stern measures in making sensitive selections discarding any kind of strong *tabdir* for any unworthy person. It would be wise of the government to consider competence, integrity and acceptability in choosing someone from outside on contract or extending the tenure of someone in the service as has been in case of Mr Mustafizur Rahman.

While we hail the government's commendable decision of extending the tenure of Foreign Secretary it is also expected that it will closely monitor the performance of the persons on contract and will not vacillate to take the right decision again whenever it becomes necessary in the interest of the country.

Arsenic Disaster in Bangladesh
An Urgent Call to Save a Nation

Many questions have been raised regarding the groundwater poisoning by arsenic in Bangladesh: When did the arsenic poisoning in Bangladesh start? How long have the people of Bangladesh been drinking the arsenic contaminated water? How many people have already been exposed to it? What will happen to this nation if the people continue to use the arsenic contaminated water for their daily requirements? Can we protect and save the people of Bangladesh from the arsenic disaster?

In this foregoing article by Thomas E. Bridge Ph.D., Professor Emeritus(Geology), Emporia State University, Emporia, and Meer T. Husain, Environmental Geologist, Kansas Department of Health and Environment, Wichita, Kansas who are currently developing a research plan for arsenic disaster mitigation in Bangladesh, an attempt has been made to find some answers to these questions.

also diagnosed severe arsenic poisoning among the people drinking contaminated tube-well water. They estimated about 50 per cent of all the wells in the country exceeded the safe maximum contaminant level. According to the recent report of UNDP, 40 per cent of all wells are contaminated by arsenic.

The description of the nature of arsenic toxicity:

1) Arsenic compounds are known carcinogens.
2) Amount of arsenic intake required to cause harmful effect depends on the chemical and physical form of arsenic.
3) Inorganic forms of arsenic are more toxic than organic forms.

4) People are more sensitive to arsenic than animals are.
5) Medical tests demonstrate a variation in contamination among individuals. Some can ingest over 150 µg/kg/day without apparent ill-effects. Sensitive individuals can be affected at 20 µg/kg/day (1000-1500 µg/kg/day for adults).

6) Doses of 600-700 µg/kg/day (around 50,000 µg/kg/day for adults; 3,000 µg/kg/day for infants) have caused death in some cases.

7) Maximum Acceptability of Arsenic Concentration in Drinking Water: The US Environmental Protection Agency (USEPA) has Maximum Contaminant Level (MCL) of arsenic set as 20 µg/L. Many scientists view this amount as above the acceptable threshold. There is growing support in favour of lowering this to 10 µg/L that is equal to the WHO approved limit.

They also described the usual symptoms of arsenicosis: The symptoms of arsenic toxicity may develop over a

lengthy period of time often taking up to 8-14 years from the initial days of contamination. This period differs from individual to individual depending on the quantity of arsenic to volume of water ingested, immunity level of the individual and the total time-period of actual arsenic ingestion.

The two following diseases are common indicators of arsenic poisoning:

1. Melanosis: Melanosis results in the gradual change of complexion towards blackishness and/or dusky skin. Generally, the limbs are first affected and subsequently the change affects all of the body. In the process of melanosis, white and black spots occur over the body, medically termed as 'spotted melanosis', and this stage of melanosis is generally a precursor of cancer.

2. Keratosis: Initial stages of Keratosis witnesses the hardening of hand palms and foot soles. In medical terms, this hardening is 'diffuse keratosis' and may gradually lead to gangrenous ulcer. Physicians often relate this kind of ulcer to a precancerous stage. Gangrenous ulcer has the potential of turning into skin cancer, such as squamous cell carcinoma and basal cell carcinoma. If the gangrene or ulcer affects the limbs, amputation is the final remedy. Worst cases of keratosis may result in wart-like seeds growing on palms and soles. These seeds (tumors) are commonly referred to as 'spotted keratosis'. Other relatively minor symptoms might be evident such as, physical weakness, burning sensation, constant warm feeling, chronic cough, etc.

Relevant information obtained from 'Arsenic Pollution

in Groundwater of Bangladesh', Dhaka Community Hospital (DCH) Trust, September 1997.

A number of common social problems arise out of arsenic contamination:

Some of the symptoms of arsenic poisoning are mistaken for more lethal disease such as skin cancer or leprosy. This mistaken identity often leads to quarantining. Those affected are often refused water from the neighboring tubewells. The affected are either avoided or discouraged to appear in public. Affected children are often barred from attending schools and adults discouraged from attending offices, visit medical professionals in the hospital, etc. Those affected with a higher level of contamination are considered incapable of working and hence victimized by growing poverty. Young women affected by the contamination are often compelled to stay unmarried. Married women affected by arsenic are sent back to their parents with children. Contamination in one could potentially affect the lives of both the couples in a given family. Eligible persons are refused jobs when found suffering from arsenicosis.

Arsenic is both carcinogenic and mutagenic. Thousands of arsenic impacted patients have already been identified. If the people of Bangladesh continue to use the arsenic contaminated water for their daily requirements, irrigation and industries, tens of millions will lose their health or die within a few decades. Those who will survive are in danger of carrying genetic diseases to future generation.

There are thousands of feet of old buried river channels and their associated floodplain de-

By Hanna-Barbera

