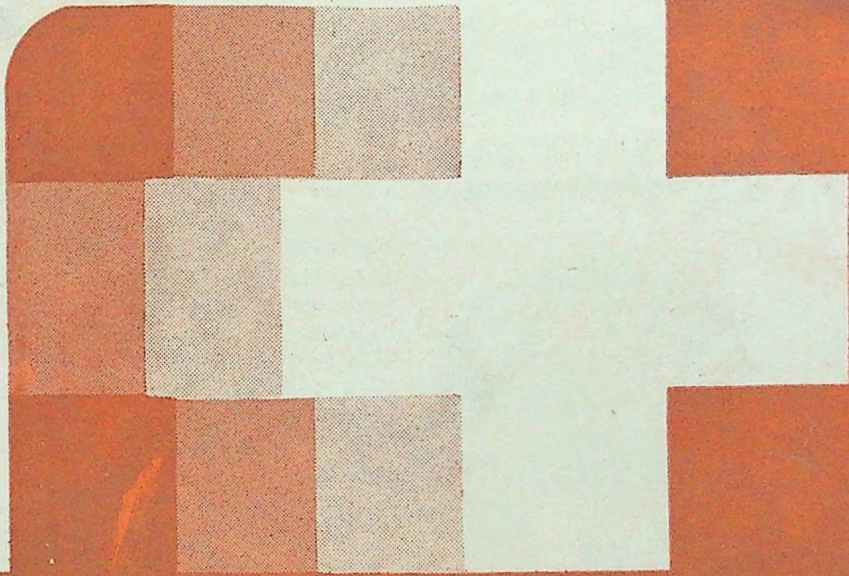


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● the challenge of bhopal ● a christian response to bhopal ● medical
research in bhopal ● mental health—introduction ● emotional reaction to
stress ● industrialisation : the darker side.

medical service

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„Articles and statements published in this journal
do not necessarily reflect the policies and views of
the catholic hospital association of India“

EDITORIAL

ANSWER ME, MY PEOPLE

What have the people of Bhopal done that on a chilly cold night they should be treated with 40 tonnes of deadly gas?

The other parallel to this question resounds in our ears every year on Good Friday when we are asked "My people what have I done to you? How have I offended you that you Crucify me? Answer me."

Bhopal is to date the world's worst industrial tragedy, not necessarily the last one. There is probably a factory near you, or there will be one soon enough. You have the choice to live in ignorance and die in a holocaust or seek information and ensure that only appropriate industries come to existence and that too with adequate safety measures.

Where were you when thousands of people died in their sleep, or woke up gasping in choking fumes or as they fled with tears streaming from their burning eyes? Sleeping? Yes it was a cold December night what else could you have done?

And where are you now?

As the Bhopal gas victims limp back to their precarious existence, widowed or orphaned, disabled and debilitated,

as the company continues to bribe heavily, destroy and manipulate evidence,

as officialdom kowtows to corporate power

as relief workers are being arrested and intimidated,

as the carrot of compensation continues to be dangled so near and yet so far,

where are you? Still sleeping?

Meanwhile the cry from Bhopal continues to be heard. My people what have I done to you, How have I offended you, that you have killed me three thousand times and continue to persecute me? Answer me.

INTRODUCTION : BHOPAL

A Peoples view of death, their right to know & live

They were asleep and unaware of impending death. But death did visit the people of Bhopal that chill winter night of December 2, 1984. A dense mist spread insidiously through the air turning this city of eight lakh inhabitants into the biggest gas chamber this world has ever known. May be, if the lessons of this industrial catastrophe are well learnt, we will never witness such a horifying spectre ever again. But the memory lingers on, haunting, macabre.

That fateful night, about 40 tonnes of a deadly gas, methyl isocyanate (MIC), used as an intermediary in the manufacture of the insecticide sevin, escaped from a tank in the factory of the multinational company, Union Carbide, spread across many areas of the city of Bhopal, and killed over 3000 people within ten days. Some reports put the casualty figures considerably higher. Many many thousands more still suffer the consequences of exposure to this killer gas, which this incident proves to be among the most deadly known to man. Deaths still occur and the lingering fear is of the possible long term effects on humans and the environment of this highly reactive gas and its reaction and breakdown products.

A reconstruction of events suggests that the temperature and pressure of the stainless steel tank containing the 40 tonnes of MIC began rising at around 10.30 p.m. that fateful night of December 2. No one seems to know why, not even the people of Union Carbide, or so they say. Possibly some water found its way to the stored MIC, though how the water leaked in is not known, or again, presumed not to be known. MIC, stored in liquid form under slight pressure, becomes a gas at 39.1°C.

It was a cold winter night when temperatures were around 12.14°C. The exothermic reaction of MIC with water, however, heated the 40 x 8 foot tank to about 100°C (one report suggests 200°C), turned the liquid MIC to gas and sent the pressure in the tank shooting upto 55 psi. That was enough to burst the safety valve in the pipe leading from the tank to the 80 foot high chemical scrubber. The safety valve was rated to burst at 40 psi. The gas rushed through an 8 inch pipe to an open vent high above the ground and gushed as a white cloud into the chilly night air.

The immediate question that arises is: Why wasn't the gas neutralised by the chemical scrubber or burnt in the flare tower before being released? Answers to why the safety devices in a high technology plant handling dangerous chemicals were inoperative or ineffective in a moment of crisis need to be sought. Apparently the rise in temperature and pressure was not sudden but took some time. Its significance doesn't seem to have registered on a personnel operating the plant. Why was this so? Is this because of the absence of an industrial culture, or is it because safety drill and safety measures were low priority in corporate balance sheets? Or was it merely because the plant was beginning to show signs of fatigue, with pipes bursting and valves not functioning? The plant, which had restarted production just a week back on November 26, manufacturing Sevin, had been shut down a day earlier to check out a faulty valve in the pipe leading from the MIC tank to the chemical scrubber. Production of Sevin fluctuates with fluctuating market demand for this agricultural pesticide formulation. Minor accidents have not been uncommon ever since

this plant was installed in 1980. Gas leakages have led to injury and even death of workers. In an accident in 1981, one worker died, in another in 1982, twenty four were hospitalised. It was, thus, only when things began to get beyond control at around midnight that senior personnel were informed. The works supervisor was the first to arrive. The works manager, informed telephonically by the ADM, arrived too late, after 1.40 am, a wet towel wrapped around his face. But by then the tank had become so hot that no one could go near it. It is partially underground, reinforced with concrete. It began to vibrate so violently under the pressure that it cracked its concrete reinforcement.

The time was around 1.30 am. One worker remembered, rather belatedly, to switch on the factory siren signalling the catastrophe to the neighbourhood. Reports suggest that the siren actually went on only around 2.15 am. But, by then, the nightmare had already begun.

A light 12 kmph breeze, blowing in a south, south easterly direction, had already safted the dense cloud towards the city. The plant workers, trained in the event of such catastrophes to run in the direction opposite the wind, ran to safety. Others were not so lucky. The gas, being heavier than air, settled down over considerable areas of the city as the wind died down, obscuring even street lamps in a foggy glow. The devastation it caused exceeded anything ever attempted or imagined in the realm of chemical warfare. The seriously affected area is placed between 5-8 kilometres of the factory, though reports suggest that the gas travelled over 15 kilometres, covering an area of over 50 square kilometres and affecting over two lakh people constituting one fourth of the city population. It hung in the air like a death shroud, creeping into depressions, houses, cupboards, foodstuffs and clothes. Most of the seriously affected areas comprises slums and shanties of the poor, spread across land once outside the city

limits, now bang in the middle of the city which has since grown and spready out. Before it dissipated in the early morning winds, the deadly gas had unfolded a drama of tragic proportions.

The people were asleep. Innocently asleep. Many never awoke, dying in their sleep. Their bodies lay under tattered razais for over a day before being carted away unceremoniously in trucks to mass cremations and burials. Those who awoke gasped in choking fumes of the obnoxious gas which burned their eyes and seared their lungs. They opened their doors only to let in toxic fumes of death. Those living near the factory were used to sudden gusts of foul air blowing from the plant, but never before had they experienced something like this. Panic gripped them — 'zahreeli gas chhooti hai, bhago'. The cry rent the air. And they fled, noses covered with pieces of cloth, tears streaming from burning eyes. They fled with whatever they could carry. Sometimes with nothing, empty handed, only intent on escaping the acrid fumes. Unmindful of friend or foe, brother or sister, they fled. On bicycles, bullock carts, buses, cars, autorickshaws, tempos, trucks, mopeds — they fled. And the poor fled on foot in a mad rush. No enchanted piper could ever have conjured such a macabre stampede. Families were separated. Many fell along the wayside, especially the poor on foot who could not outrun the gas. They fell, eyes burning, retching out their insides, unable to breathe, weary, waiting for inevitable death.

The railway station lay in the path of the gas cloud, moving more early than anything out of a science fiction film. It left behind death. Passengers in waiting rooms, porters and railway staff who stayed on died. Most others fled. The station remained cut off from the rest of the country for over seven hours as trains were halted outside the city limits. Bodies lay around haphazardly in the chilling finality of death.

By the time an unmindful sun dawned with pitiless regularity on a beleaguered city, between 300 and 500 lay dead, many on the roads. Over 2000 lay dying in hospitals and homes. Over 20,000 victims began their weary trek to hospitals for treatment that day. It was December 3, 1984. Black Monday.

The army and the volunteers then began pouring in. Citizens, concerned about their fellowmen, eagerly, selflessly helping the distressed and the dispossessed. It was only later that the state could gear up its machinery to face the calamity. Police, medical teams and administrators were hastily put into action. But they proved woefully inadequate in the face of this unprecedented and unparalleled disaster. The state took a couple of days to get to grips with the situation and arrange relief and refugee camps. By then the tragedy had acquired frightening dimensions.

All around lay corpses of the dead, bellies distended and beginning to rot. The bloated carcasses of animals were carried in truckloads outside the city limits, dumped in collective graves with salt and lime. The city mourned its dead and lay desolate.

The horror and terror soon sank into apathy and numbness as the dead came pouring into the burning ghats and cemeteries. They came in truckloads from the hospitals and elsewhere. There were mass cremations. Orange flames leapt into the skies without respite. Crematoriums ran out of firewood and graveyards had to open old graves to bury the newly dead for want of space. Some say trucks carried their grisly loads as far away as the Narmada in Hoshangabad for burning and disposal. Despite the figures quoted, no one really knows how many bodies were consigned to oblivion that first day. There was little dignity left in death. Often nameless, unclaimed, they died unwept, uncared for, merely a statistic for the world looking on aghast at this horrendous nightmare.

And then began a strange process of disinformation and, often, suppression of information which manifested itself throughout the course of the incident, with telling consequences. In fact it began that very night itself. 'Nothing is wrong, said a senior factory personnel when contacted by a frantic police when things began to go haywire. 'There was a gas leak, but everything is under control now', he was to add later, even as the deadly gas was taking a toll of the hapless people. 'It is not a dangerous gas,' said the medical chief at Carbide when contacted by frantic doctors. 'It is not lethal said another senior factory personnel, 'Can't you see I am alive?' The medical chief at the Virginia plant suggested a wrong medicine and later pleaded he had got the name wrong over radio. Ironically, these very senior medical personnel formed the core of the committee of doctors set up to decide on a line of treatment for the victims.

In the morning of the first day, five senior officials of the factory were arrested under Section 304(A) — causing death through negligence, the factory was sealed pending an enquiry by the CBI and an enquiry by a sitting judge was announced. Curiously however, the arrested officials, confined in the plant, were looking after it in their period of detention. The sealing by the CBI was more than symbolic. It effectively sealed most information about the factory and what really happened there that night. It didn't stop people from asking why the Government had at all permitted a factory dealing with such hazardous chemicals to be built so close to the city. Or why the basic safety norms don't seem to have been insisted upon by its factory inspectors.

The misinformation continued. 'This factory will never be permitted to produce anything', fumed the state in righteous anger, only to later agree to the production of Sevin as the only 'zero-risk' neutralisation method for the remaining MIC in the plant. 'The factory offi-

cials are guilty of gross negligence, they will be punished', said the state, only to have senior Carbide officials as the guiding spirits of the team of experts set up to decide on a course to neutralise the remaining gas.

The neutralisation drama only heightened the level of confused information. Was it actually meant to encourage people to flee the city without resorting to the drastic step of an evacuation? How else does one explain the volley of confused and contradictory statements coming from medical, scientific and Government experts regarding the gas and its effects. 'The water is safe', said the experts 'but boil it before drinking'. 'Vegetables and fruits are safe', said the experts, 'but wash them well before eating'. 'The fish is safe', said the experts and then closed the meat and fish markets. 'The air is safe', said the experts, but what were the tests that they conducted? 'Don't panic', said the administration, yet had scores of buses brought into the city to carry people away. The public did not know what to make of the situation. They did the only

possible thing. They disbelieved what was said and fled the city.

Time marches on inexorably. The city limps back to a semblance of normalcy. The nightmare however still continues. It throws up many questions. About the unchecked use of science in industry, about the nexus between the industry and the state, in a democratic set up. About the existing dangers from the hundreds of factories which dot the country, harbouring their poisons inside or spewing them out into the wind, water and soil of the earth. And it raises the fundamental question about the fundamental rights of a citizen of this country to know and to live.

Bhopal has already moved into the annals of history as yet another example of man's inhumanity to man. An example of callous mass murder legitimised in the name of science, industrial progress and the state. Can we just sit back and let this black act become merely a footnote in a history book?

How many Died, How many were Affected ?

The Dead

The official Indian government figures say that about 1,700 people died.

The press reports that 2,500 people died.

A conservative estimate by local relief workers suggests that 5,000 may have died. They note that 1,000 or more died outside Bhopal in surrounding villages after they fled.

The truth may never be known. Many of those who died have no official record; no ration book, no permanent address. Who can count the dead who never officially exist-

ed? And when whole families died together, there was no one to register their deaths.

The Affected

That night, 200,000 people, a quarter of the city's population, were affected by the gas. Now, some months after the disaster the government claims there are no long-lasting health effects, but doctors estimate that some 50,000 people have been seriously affected. Many of these are poor people, with no means of survival beyond their ability to do daily manual work. Now they cannot work, and they have nothing.

The Challenge of Bhopal

"The growing multinational culture must be destroyed because it leads to economic chaos, increased social disparities, mass poverty and filthy affluence in coexistence, environmental degradation, and ultimately civil strife and war.

To get a balanced, rational development and to preserve the environment, a new development process is needed. The biggest intellectual and political challenge of our times is to articulate and demonstrate this new kind of development".

- A statement of shared concern Citizens report on state of India's Environment, 1982.

Its six months since the worst industrial and environmental disaster in recorded history. Bhopal has not only been a nightmare for those who were there on the night of 2/3 December 1984. It is also a portent of events to come.

World Environment Day (5th June) has come and gone. There have been the usual meetings, seminars and lectures, the usual lip-service to ecological sensitivity, the usual narrations of the health and social hazards of environmental pollution and the usual pious recommendations of what can and should be done.

How many more Bhopals will we need in this country before we are shaken from our apathy?

- from our callousness to our disadvantaged and exploited fellow human beings who are always the worst hit in such disasters.
- from our insensitivity to nature, our forests, our rivers and our land.

- from our insensate rush for chemicalising and technologising our lifestyles.
- from our race for profits even at the cost of the health of our workers, our people.

The medical community in India will be increasingly called upon to respond to the medical and health problems caused by more ecological disasters. What will our response be?

Will we see every disaster as a change to refine our clinical skills, satisfy our charity and welfare urges, exploit the research potential for career development and use the opportunity to ask for more and more sophisticated gadgetry for our institutions?

Or will we be challenged by these disasters to raise our voice collectively to oppose the unhealthy trends in our society to use our knowledge and social potential to support the growing awareness for a healthier and more egalitarian social system; to use our research skills to strengthen and conscientise our fellow human beings to an increasing health and ecological awareness.

The dilemma of a man who enters a room to find a tap running and a wash basin overflowing, faces us today. Will we choose to be floor moppers or tap turners off?

Overpowered, compromised and hypnotised by the products and high pressure sales tactics of the multinational pharmaceutical industry, our sensitivities have been so dulled that we are quite content to be merely 'floor moppers'. Can we ever be tap-turners off? The International movement of physicians for prevention of Nuclear war is a thought provoking example showing that if we want to, we can.

Bhopal too is a challenge? So are many other more insidious developments in our country. The growing investment in nuclear—energy now discredited as an energy resource in the West, or the gradual take over the cottage industry in food by big business, — each of this though different from the other has a growing similarity representing either a sub-

servience to the profit motive or an insensitivity to health hazards or both.

Minimata, Seveso, Long island were too distant to make any impact. Amlai, Chembur, Handigodu, Harihar, Zuari, Nagda, Mavoor, Silent Valley, Thal vaishet have not stimulated us either. Will Bhopal do so?

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A Christian Response to Bhopal

The entire Catholic Church, the laity, the religious and the clergy was involved in the relief and rehabilitation work of Bhopal.

The Archbishop himself took the lead and called a meeting of teams of sisters and priests on December 4th morning. The teams set out to affected areas.

What they saw did not allow them time to invite for another discussion. They got to work immediately — medical aid was arranged, eye drops, injections, cough syrup and tablets, antacids and antibiotics. Food was arranged for them in their homes and some had to be few with persuasion. The evening found the Archbishop at the site. The team informed him of the danger of the delay in the dead animals lying around. The Archbishop was instrumental in hastening the clearing of the animals and also in facilitating the process by arranging for a few pick-up vans for this work. Wherever help could be received, attempts were made to reach help to them. Hospitals were filled — with patients, doctors, relatives, nurses, volunteers and people. People came to search — for relative, for news, for something to satisfy their own curiosity and also to strengthen their own strong selves. It was then discovered that some children were left "alone". Alone, because their parents were not identifiable, or were no more.

The Government approached the administration of Asha Niketan and asked them to look after these forty odd children till such time they had taken a more permanent decision about it. The children were put aside in one of the closed — in corridors of the children's hospital and the sisters had to give a twenty four hour service to these. The Administration accepted the challenge and did a most

Christian Service in washing, feeding, caring and loving the children.

December 5th to 9th saw the team of volunteers together with others from college, schools, associations and families, administering medical attention and supplying food at centres and from house to house.

On December 9th, it was thought necessary that a team sit together and put their mind to work to see what should be done immediately and if necessary, for the future.

It was decided that we should concentrate our efforts on a fixed locality since the total area is too vast for us to effectively care for. It was also agreed that the people of Dharkwar Nagar, Kainchi Chohola be taken up. These two areas besides being affected were by far most neglected as they are far from the lime-light. It was also decided that immediately 'Relief Work' be given in terms of food and medicines. Till such time the people get comparatively better, cooked food will be distributed. After that, for some fixed time raw food materials will be served to them. Catholic Relief Services, Bombay, agreed to help in this area. Medical aid was continued to be given through the nurses at the centres and at the homes.

With the announcement of the Chief Minister, that the work on the use of the remaining gas was to begin on Dec. 16, 1984, the Bhopal City witnessed a mass evacuation of its inhabitants. People left with their families either because they were afraid, or because this was an opportunity to avail of for their winter vacation, or just one reason to run away. However, the City of Bhopal was left desolate and at a standstill.

The Government Offices were open but still not much work could be done as many of the workers were not present. The shopping centres were closed, the streets were bare.

The Government Authorities had arranged a few Camps to accommodate the people from the certain specified 'affectable' areas. Archbishop Eugene D'Souza was one of the members on the high level committee to look into the arrangements of these camps. The first few days the Committee members went around the camps to look into its working and meet with the campers. The arrangements were elaborate and every detail was taken care of. However, the expected number of campers did not turn up. Arrangements were made for buses to transport the people, camps were equipped with tents, food for the people, medical aid, toilets and what not. People however, in the majority, found their own hide-outs and fled away from the site.

More than just administering food and medicines to the people, the need is to be with them, to give them the support and encouragement, is a need. There are a number of families that are not merely shocked but very much afraid. The mass media too were no help. There is plenty of ambiguity in what is happening, what is said from mouth to mouth. As a result, they were asking themselves if they would want to continue to live in the vicinity of the factory. Our presence gave them some assurance and support.

With the return of the inhabitants of the affected area to their own places of residence in bits and pieces, the city shops opening for the daily business and life going on as usual, the voluntary help offered from other agencies was reduced. The Archbishop grew concerned about the fact that there were so many people in the affected area that were still not cared for. Help was being offered from all sides — Financial aid care from concerned friends, and

members of our Institutions in Bhopal offered personnel. This led the Archbishop to call for a meeting of the heads of the different Institutions here at Bhopal. On December 26th, 1984, it was explained to the members at the meeting that there was an urgent need to help. Financial help was coming in. It was necessary to find the people to reach out this help to the Heads of Institutions were asked to take courage and offer their help. They were asked to choose any sector that they thought they could take care of. They were asked to make a commitment to render this help for a period of a month. This help would be in the form of meeting with the people of the area, understand their needs, administer food, medical care and at the end of the month suggest a plan of future action if any has to be taken up. The response to this request was more than encouraging.

Dwarka Nagar continued to remain in the care of the Core group. Kainchy Chola being a big area was divided into two compartments, St. Joseph's Convent School taking up one and the S.V.D. Fathers with their Seminarians the other. Chola Mandir was in the care of the Seva Sadan Parish with the S.D.B. Fathers leading the group. Neech Chola Mandir was taken up by the Asha Niketan Parish assisted by the Asha Niketan Rehabilitation Centre and Krist Premalaya Seminary. Garib Nagar was to be looked after by the Jehangirabad Parish together with the Missionary Sisters of Charity and the Craft Training Centre at Jehangirabad. Chola Road was to be looked after by the St. Francis School with Gabriel Brothers leading. The Orissa Colony came under the patronage of the C.M.I. Fathers of Poornodaya. The B.H.E.L. Parish promised to help the Core group, the Clarists Sisters helped the Poo nodaya Fathers and the Holy Family Convent Sisters helped the S.V.D. Fathers. All in all, every Institution had some responsibility.

The groups set out in all earnest from the very go. Families were identified, ration cards were handed out and the distribution of food was done. The ailing members were attended to and it was found that a new life had entered into the lives of the people.

Come January 3rd, 1985, the people of the effected area were aroused to voice their grievances to the Government by a long procession to the residence of the Chief Minister. Whatever may have been the result of the procession, an announcement was made by the Government that food would be made available to the people through the Government Ration Cards. By January 7th, 1985 it was found that the Government was sincere to its word and long queues were made before the ration shops. With this, we on our side held back our rations and persuaded the people to make use of the Government provisions. People were then helped by our volunteers to receive their ration cards. Medicines however continued to be given as there was no reliable source of medical attention being given. Care was taken to make sure that no family remained hungry or uncared for because of any lapses.

The Morcha :

It is a fact that on January 1st, 1985, a number of aggrieved people of the affected area got together and blocked the main Commercial road—Hamidia Road. Buses from outside the city were not allowed to enter, and vice versa, none were allowed to go out.

It is also a fact that on January 3rd, 1985, a long procession of about seven thousand men, women and children marched from the Union Carbide Main Gate through the city to the residence of the Chief Minister. The Chief Minister not being present, the people stayed on the night to await his arrival. On his arrival, the Chief Minister met with the people, tried to tell them that the Government is trying to

do its best. But, the members did not relent. They stayed on for ten days. Their demands :

1. The Union Carbide should be removed from the present site with immediate effect;
2. Relief and Welfare Centres should be set up for each sector of the affected area to look into the socio, economic and health needs of the people.
3. Every family in the affected area should be given an ex-gratia payment of Rs. 2,000.00.
4. The widows be given pension, the incapacitated members be given social Security and the orphaned children be taken care of.

This was the time for us to get down and help the people to do some constructive work. They must get themselves to do something for themselves. They must learn to fend for themselves. They must develop a sense of self respect and depend on themselves.

For the children, we opened a small school, where they were kept busy during the day. They receive their mid-day meal cooked and served to them. On registration, we gave them some suitable clothes to wear. Cleanliness, discipline, development of values and respect for themselves and others, besides teaching then the reading, writing and arithmetic will be given them.

For women, a craft training programme is conducted where they are kept busy doing some craft work for which they will receive some remuneration. Here again an attempt was made to give them some adult education and a sense of values.

For the men, small jobs in the colony was given them to do for a few hours without expecting too much from their weak bodies.

For this they will be paid a daily wage and thus give them a sense of satisfaction of earning their living and doing something for their own community.

In all these works, attempts were made to take care of their health problems. Besides the food that they earn or receive, the medicines or multi vitamins were given to them to strengthen their bodies to physically fight against any kind of hazard that comes their way. With this it is also hoped that they will improve their psychological selves and develop a sense of independence and stop hoping or fighting for hopes that they hear people give them.

Towards this, we occupied two rooms where the core group is presently in residence. Additional rooms in temporary style were constructed to house a small clinic, a Balwadi and a Craft Training Centre. Children are being identified for whom we could offer a sponsorship programme through the Christian Children's Fund at New Delhi. This programme will help us focus on the child no doubt, but in keeping with the philosophy of the CCF we will help develop the family and through the families to the community development. Medical equipments were procured for better attention to the patients. A doctor has been employed to give professional service.

With the passing out of the month of January 1985, things began to take shape. Thanks to the many members of the different institutions who gave of themselves to share their feelings, their selves and all that they had. With their presence during those days, Christ and the Church were made present. The people saw the interest, the devotion and the love of Christ made manifest through the Christian.

Till this time it had been my cry of 'uncertainty', 'change of events', 'unrealistic demands'. Today, as I look back to see it all, it seems HIS PLAN to have things happening in the way they did. You and I should be proud

to know that here was here you and I are in the fulfillment of this great plan. Let us pray that the decisions that we take may be in the better fulfillment of the plan.

The Happiness

At the end of January 1985, the two sister nurses who had generously been given us during the relief work, were called back. The sisters of Holy Family stepped in to continue their services and promised to help till the end of March 1985.

The activities in the different sectors grew less as members got back to busy themselves with their own home work. Except for the Asha Niketan Parish who looked after a part of Chola Mandir, the C.M.I. Father, who looked after the Orissa Colony. The sisters of St. Joseph's Convent continued to look after a part of Kainchy Chola.

Beginning February 1985, a full fledged medical clinic was arranged for with the necessary equipment. An X-ray machine was procured, installed and used. A fulltime doctor was employed. A specialist visits the clinic a couple hours a day and a Gynaecologist visit the clinic to take special care of the women. The pregnant women are under instructions to regularly visit the Gynaecologist and receive her instructions. The children are being thoroughly examined in turn. About 250 to 300 patients are attended to daily.

The Balwadi, with one hundred and sixty odd children, continues in the same style. On January 26th, the children were given a white dress and practised to a solemn parade to host the National Flag for Republic Day and sing the National Anthem. The Archbishop was rejuvenated in the midst of these children when he hoisted the flag and sang with them the National Anthem as brothers and sisters of one Indian Nation. The children performed for their parents and teachers a few exercise and sang action songs. The Archbishop

shared his joy with the children by sharing distributing sweets and eats to the children and all the people of the colony.

The parents took advantage of the occasion and surrounded the Archbishop to plead with him to ask his team to stay with them and not leave them alone. In an empathetic and parently manner, the Archbishop gave them the assurance and promised to continue to help them.

The women continue to gather together to learn a few stitches. During the period, it is taken off the give them a few Morals Classes and also the proper care of their home and children. These too are benefited with a mid-day meal. It may be mentioned here that one of the objectives in starting the Balwadi and Craft Centre was to give them some nutritious food. Having done so, we find that, that was a good decision. In a weeks time their colour changed and the faces grew brighter. They do have their regular meals at home. But we were not sure that the food that they eat is nutritious.

For the men folk it was discovered that many of the men were left jobless. Others did not have jobs. We advanced them some money to purchase a hand cart to help them go out to earn their living. Others were advanced money to help them improve their business. It was also discovered that some of them had not had the money to pay the rent for their houses. We helped them and made them secure in their own rented houses. Some were given small jobs in the colony to clean up some of the areas and also to build up the temporary sheds for the dispensary, the craft centre and the workshop. With the help of some of

our friends, a small unit of chalk making was started where the adolescent were given some responsibility. We hope that our educational institutions will help us by purchasing the chalks from us for use in their institutions.

During this period of three months our team has been here. Relief has been reached out to the peoples around the area. The people have been touched by the services and our presence. Their response to us has been an INVITATION TO STAY. Having worked with them, lived with them and shared their feelings, we have become of their need and so. HAVE DECIDED TO STAY.

Negotiations were being made to purchase a house to live in, when we were suddenly told to vacate the two rooms from where we were offering our services. We tried to make further attempts to talk them into a more generous yet reasonable agreement. It did not make sense. We had to leave.

On the other hand however, while in the process of planning our stay, some generous soul offered us a room to locate our office. With no further delay, the furniture was brought, laid out and work began. Today it is a common office for AGAPE and the local community members to come together and discuss their problems.

Come mid February, the Archbishop raised the Centre to one more of the Archdiocesan Welfare Centres. A resident priest with a group of sisters would be appointed. Not to delay further, it was informed that the Salesian sisters of Mary Immaculate from Nagpur had agreed to come and begin the house from March 1985.

Medical Research in Bhopal

—Are we forgetting the people?

Concern for man himself and his safety must always form the chief interest of all technical endeavours. Never forget this in the midst of your diagrams and equations.

—Albert Einstein

Preamble

In a tribute to the medical relief workers involved in service to the Bhopal disaster victims the ICMR has noted (1) that a disaster of such magnitude, of such suddenness and caused by the release of a highly toxic chemical methyl isocyanate (MIC) into a densely populated habitat is unparalleled in human history. The doctors, medical students, civil servants, governmental, public sector and voluntary bodies and the people themselves rose to the occasion in a human gesture equally unparalleled'

In the absence of authoritative information on the released gas; the unwillingness of the company to part with authentic information; the unpreparedness of the local bodies and the government health authorities to understand the consequences of the disaster; and the absence of technical or toxicological expertise on MIC among our scientific community, it was imperative that a national body like the Indian Council of Medical Research through its own initiative would have to harness the scientific medical expertise in the country including the local medical college community to meet this challenge. Considering that the affected population was over 2 lakhs and that the dead were over 6000 (though official estimates are 2000!) this research initiative had to be equally unparalleled in meeting the phenomenal challenges of the world's worst recorded ecological disaster. Do the records of events in the past four months since the disaster bear this out?

The Plan

A report on the first nine days of the Bhopal disaster identified (1) three objectives for the ICMR's research programme:

1. To establish a clinical and patho-physiological profile of the hazard which would also provide clues for improved patient management and clinical outcome.
2. To study the long term sequelae of toxin exposure to lung, tissues, foetus, genes and cancer induction.
3. To obtain a basic understanding of the biological alterations associated with MIC exposure.

Strangely enough there is no mention in this report of a strategy by which conclusive research data as and when available would be transmitted to the relief and rehabilitation effort in Bhopal, i.e. to the treating doctors and through a health education effort to the affected public.

A report of projectization of ICMR supported research effort (2) lists out 17 study projects which covers acute and long term health effects, lung functions, follow up of children aged 5-15 years, ocular changes, pulmonary and neurological changes, growth and development of new borns, clinical and forensic toxicological studies, pathological and microbiological investigations, radiological studies, biochemical and immunological studies, carcinogenicity, mutagenicity, teratogenicity and chromosomal changes, data management in-

formation system, hospital based cancer register, cytofluorimetric studies and blood gas analysis. The studies ranging from a time span of 6 months to 5 years would incur a total financial outlay of 1.07 crore rupees.

Some surprising omissions in the list were the assessment of psychological stress and its manifestations in the affected families, studies on health of women (not obstetrical outcome but gynaecological effects) and the assessment of medico social effects like reduced earning capacity and functional disability which would affect rehabilitation efforts. Though there were references to an epidemiological and community based outlook the research endeavour atleast as on paper did not seem to be a coordinated holistic effort in understanding the total problem but basically a series of vertical research programmes initiated and funded according to the interests of the professors involved in the exercise.

Results

It is four months since the tragedy and about three months since many of the research programmes got underway.

As far as a communication strategy goes three press releases and two lectures by the director generals and a minutes of the meeting on the thiosulphate controversy are the only freely available literature on the research (3-8) efforts. From these all that any member of the scientific community or the general public can gather are :-

- i. that there is no evidence of irreversible eye damage or blindness
- ii. that the autopsy findings are indicative of severe respiratory damage caused by pulmonary odema and asphyxia;
- iii. that studies of exposed persons with lung symptoms/signs have shown obstructive and or restrictive abnormalities;

iv. that a double blind clinical study undertaken using sodium thiosulphate and a placebo has established that sodium thiosulphate administration results in symptomatic improvement and in increased excretion of thiocyanates in the urine. On the basis of clear cut results, the State government has been advised to administer sodium thiosulphate to the exposed population and detailed guidelines have been drawn up and circulated;

v. that two visiting psychiatrists have found that 10-20% of the affected individuals attending the medical clinics in Bhopal are presenting with psychiatric manifestations — symptoms of anxiety and depression are foremost.

Why this secrecy? or is it administrative over caution?

A more updated report prepared in mid March collating all data as of that date has again become a casualty in the commitment to secrecy (caution) and no press release has followed.

Issues of concern

An mfc fact finding team which visited Bhopal in mid February at the request of various non governmental agencies and action groups published a report on the realities of medical research and relief which has been widely circulated and is now well know (9). In mid March an mfc team of 16 members camped in Bhopal and undertook an epidemiological survey which included detailed history taking, physical examination, lung function tests, haemoglobin estimation of a 10 percent sample of a severely affected area and a control area (10).

The team also met decision makers, relief and service providers, medical teams of voluntary agencies and others, apart from under-

taking a survey of the people's perceptions of relief services and an overview of the services itself. The findings of the team are being analysed and will be reported shortly (a press release is published in this issue) but the experience of the third week of March in Bhopal strengthened the findings of the earlier fact finding team and identified a whole series of issues of concern in the ways in which research efforts were becoming exploitation of peoples' suffering rather than expressions of support to programmes of human welfare.

1. Lack of dissemination of technical guidelines

The medical relief service continue to be starved of authentic and authoritative scientific medical information to support clinical judgement and patient management. In the absence of clear cut guidelines from the seniors in the profession treatment continues to be adhoc, symptomatic and unstandardised. Findings of autopsies, lab investigations and x-rays and other tests are not available to the treating doctors. Doctors have not been alerted to the fact that a wide range of symptomatology like fatigability, weakness, memory problems are all part of the MIC syndrome. In the absence of such information peoples' sufferings have often been passed off as malingering or compensation neurosis.

2. Pills distribution

The treatment basically consists of a whole series of pills which are efficiently and actively prescribed to the people in a sort of conditioned reflex. In the absence of proper record linkages each patient is collecting large amounts of pills and not feeling the better for it, apart from the dangers of over drugging. Other forms of care, counselling and non-drug therapies have not been thought of.

3. The Thiosulphate controversy :

Even after the ICMR studies establishing

the validity of thiosulphate administration and the preparation of clear cut guidelines for its administration, (6,8) this specific antidote is not being used as effectively as it should be. It has become a causality in a medical controversy between cyanogen and carbon monoxide lobbies and the victims rather than being informed and helped are being confused and neglected.

4. Women's health :

The mfc fact finding team had highlighted the problems of women who have suffered abortions, still births, diminished foetal movements, suppression of lactation, abnormal vaginal discharges and menstrual disturbances. The studies undertaken by two doctors of mfc reported in this bulletin (11) establish the magnitude and severity of the problem. It, however, continues to be neglected by the concerned authorities.

5. Absence of Health Education efforts :

Whatever the other validity of the research efforts, in the ultimate analysis it should get translated into a strategy of health education and awareness building of the affected people. As of date there are no official guidelines or efforts in this direction. The range of areas is phenomenal advice to mothers of the risk to the foetus and preparation for consequences including options for MTP, advice to couples on contraception till detoxification is over, breathing exercises and antismoking advice to those with fibrosis of lungs, avoidance of overdrugging of pregnant mothers, advice to mothers regarding feeding of infants/children as lactation suppression has taken place, availability of thiosulphate and other medical relief measures. None of this has even been recognised as being necessary.

6. Poor epidemiological and medico social orientation of problem assessment.

The general impression is that research and

relief efforts are suffering from an acute clinical and institution based orientation rather than a community based epidemiological orientation.

Only if all data is field based and is related to known available morbidity patterns (or comparison with controls) can early problems and special trends be identified and urgently acted upon. The danger of getting into the pursuit of a very neat and fool proof epidemiological planning exercise can be equally counter productive.

7. Lack of informed consent

The people are not being informed about the tests being done. Nor is consent being taken for being included in the studies or for procedures to which many of them are being subjected to. This is a minimum medical ethic.

8. Lack of coordination

This is a universal problem and the ultimate sufferer's are the disaster victims themselves. This incoordination is occurring between government services and research efforts in the medical college, between the different research workers themselves, between government and non-government relief efforts, between voluntary agencies involved in action, relief, rehabilitation and of all these groups with the disaster victims themselves.

While a more detailed report is awaited we in the mfc appeal to government decision makers in Bhopal, medical college professors, ICMR scientists, IMA, voluntary agencies, action groups that there are urgent needs to be actively met:-

- * Need to evolve a bold, imaginative and open communication strategy to all the doctors and health workers (treating the disaster victims) who are presently starved of authentic technical/medical information hampering clinical judgement.

- * Need to evolve a creative, relevant health education and awareness building public education strategy to meet to expectations of the disaster victims and to help and reassure them through the crisis and prepare them for the eventualities.

- * Need to ensure that research efforts are geared to supporting relief and rehabilitation efforts and not become esoteric exercises for institutional development and career advancement.

- * Need to make the commitment to patient care and human welfare primary and to ensure that it does not get bogged down by professional rivalries, inter departmental incoordination, procedural constraints and administrative protocols.

- * Need for closer coordination between voluntary agencies, action groups, citizen committees, medical and health workers and the people oriented and socially sensitive sections of the medical profession and government authorities to ensure that the peoples' suffering are not exploited and made pawns in the games played by politicians, multinational companies, and misinformed professionals — all symptomatic of an exploitative social system.

An authoritative Lancet editorial (12) had mentioned that 'In a year's times we will have learned a lot more about methyl isocyanate at an appalling price'. With the prevalent medical anarchy in Bhopal in relief and research, this price may be immeasurable.

—mfc team, Bangalore

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SITUATION VACANT

A parish owned L shaped building with 8 rooms, latrines and kitchen is laying unused in the vicinity of the beautiful church here. The parish will place the said building at the disposal of a family of Doctors who can live rent-free in the staff quarters nearby for serving the rural sick. From Telli-cherry or from Cannanore this village is 62 kilometres east and south-east respectively. The recently tared road from Edoor helps 6 service buses to ply their trips past IRITTI which is 10 kilometres away, having private hospitals.

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Mental Health—Introduction

On the night of December 2/3, 1984, 40 tons of methyl-isocyanate (MIC) from tank 610 of the Union Carbide India Limited factory at Bhopal leaked into the surrounding environment. This leak of an 'extremely hazardous chemical' which occurred in a short span of few hours, covering the city of Bhopal in a cloud of poisonous gas, left behind a large number of dead (1400 to 2500), thousands affected by acute and chronic effects of MIC. The estimated population has been exposed to MIC is 2,00,000 of the 7 lakh population of Bhopal city.

The Fourth Advisory meeting on Mental Health (ICMR) (December 12-14, 1984) viewed the mental health needs of the affected population as follows:

"The recent developments at Bhopal involves exposure of 'normal' human beings to substances toxic to all the exposed and fatal to many raises a number of mental health needs. The service needs and research can be both viewed in the short-term and long-term perspectives.

The acute needs are the understanding and provision of care for confusional states, reactive psychoses, anxiety depression reactions and grief reactions.

Long-term needs arise from the following areas, namely, (i) psychological reactions to acute and chronic disabilities, (ii) psychological problems of the exposed subjects currently not affected, to uncertainties of the future, (iii) effects of the broken social units on children and adults, and (iv) psychological problems related to rehabilitation".

It is against this background of awareness of the mental health needs of the affected population of Bhopal and the observations of the visiting mental health teams from NIM-

HANS, Bangalore and K.G. Medical College, Lucknow, the present training for the medical officers has been planned. The focus of the one week training was to provide mental health skills needed for the care of the short-term needs, especially among those attending the medical clinics.

Before considering the larger aspects of the mental health care let us consider the question of 'are there special mental health needs of the affected population?'

VENUS CIRCUS TRAGEDY

At this point, we would like to share the experience of colleagues from NIMHANS, Bangalore (Dr. H.S. Narayan and team) who actively provided help in a crisis situation. This was as follows :

On the 7th Feb. 1981, fire accident occurred in the city of Bangalore taking a heavy toll of lives. The investigating team followed up by home visits, 58 families with 70 family deaths. The team visited each family many times and provided emotional support by listening to their feelings and offering emotional support.

The observation of the emotional reactions of the 58 families are as follows Chronic grief (75%), excessive guilt (52%), excessive anger (37%), change in the attitude towards God (31%), sleep disturbance (67%) eating problems (57%), preoccupation with thoughts, vivid memories and perceptual anomalies (90%) death wish (18%), change in pattern of social and recreational activities (45%) were noted in the family members.

In addition, 46% reported deterioration in health since the time of relatives death of these 12.5% consulted a general practitioner or specialist for their health problems.

July 1985

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COMMUNITY HEALTH CELL
47/1, (First Floor) St. Marks Road,
Bangalore - 560 001.

Of the affected family members, 74% gave evidence of depressed feelings. Some of the males were consuming more alcohol. The team noted that 36% of the members need psychiatric intervention.

The team developed a method of providing help to the affected families which resulted in positive adjustment.

Emotional Reactions to a Disaster

The above experience of understanding the needs of the disaster victims is relevant to the current needs of the Bhopal population. The magnitude of the disaster at Bhopal is much larger compared to the Venus circus tragedy not only in numbers but in its devastating physical and social effects.

At this point let us look some of the observations of the psychiatric team visiting Bhopal. Some of the reactions noted were :

Mr. A. is 40 years, mechanic, with a family of 6 children (2 male and 4 female). On the night of the disaster, he lost 2 of the male children and he himself sustained injuries. When seen at home he was slow in talking, crying, had attempted to end life the previous night, feel that life was not worth living. He says 'I keep thinking to my two sons, if I stay at home memories of the children comes to mind, I find it difficult to forget them, I sometimes feel I should free them, who will care for us, our life has become destroyed. I will continue to stay here so that if the gas leaks again the whole family can die'. Since Dec. 2/3 he has not returned to work. (Feb. 1985).

Ms. B. 36 years is 7 months pregnant. Her past pregnancies have been normal. She complained when we met her at home of anxiety *GABARAHAT*, poor appetite and fear of going mad by eating of medicines. Her sleep is markedly disturbed and cannot sleep

in a closed room. She is also noted to be irritable and can not tolerate criticism leading to frequent quarrels. She worries about the child and does not want to go to the hospital for the delivery. She feel the child in her womb is not as active as before (Feb. 1985).

Mr. C., 35 years, a blacksmith, with wife and 2 children was constructing his house with bricks when we met him in Feb. 1985. He told us that he feels that he destroyed the earlier kutchha wood house he felt that the wood still contained the gas. He cannot cover his face with razai and sleep. He has many bodily complaints and on enquiry says he has lost his sexual desire. At nights, he gets in the middle once or twice with anxiety (*gabarahat*) and has to go to open spaces to feel better. He has not been taking any treatment (Feb. 1985).

Ms. D., 40 years, housewife, when seen in her house-complained of headache, sleep disturbance feelings of anxiety. On enquiry she says these days 'I do not want children to leave me. I keep looking for children till they return from school, I want my children to be with me all the time. At night I wake up once or twice and check whether children are well'. She also feels that everything is lost and has lost the confidence in future. She has a son (13 years) who has disability in one leg due to polio (Feb. 1985).

Mr. E., is 14 years, complains of pain in the eyes, throat and swelling of abdomen. He has abdominal pain most of the time and at times wakes up in the night with pain. His sleep is disturbed. He has dreams of running away from home and the events of that night. These days he is finding school less interesting. He cannot concentrate on studies and cannot remember. On enquiry mother reported that he has wet his bed 2 or 3 times in the last one month. While talking to us he started crying and said 'so many people have died and it can happen to me also' (Feb. 1985).

Ms. F., 13 years, seen in the 30 bedded hospital where she was admitted for breathing difficulty. Since December she is confined to bed and can hardly move for his basic needs. She also has cough and feelings of anxiety. There definite evidence of huge damage on X-ray chest. She cried and expressed that it is better to die than live. Her future life will be miserable (April 1985).

Ms. G., 35 years, married woman with continuous cough and extreme degree of dyspnoea has been in the hospital since December 2/3. She cannot sleep due to cough. In her family, she lost two of her four children and her mother and father-in-law. Currently her husband is looking after the children. He was working in an another city and this is not affected. She cried during most of the interview. She was angry about what had happened to her and felt that life is going to be miserable (April, 1985).

Ms. H., 50 years old, helper in one of the medical centres was a very good worker. Since December, she has become irritable and quarrellsome. She reacts with violence to requests by patients and recently she ran after a patient and him. She is also known to be forgetful and cryings without reason. All the staff of the centre wonder what has happened to her. 'She is now a completely changed person' (April 1985).

The above eight descriptions are representative of the type of reactions seen in the gas affected population.

Types of Emotional Reactions

The reactions are of three types.

1. Emotional reactions to the disaster, though the individual himself or herself is not having any physical problems due to direct effects of the gas inhalation. These

are the reactions to the happening of the unexpected and the destruction of the sense of confidence and security.

This type of reactions are seen in the form of subjective feeling of therapy, feelings of anxiety and depression and disturbance of biological functions like sleep, appetite and sexual interest.

2. *Emotional Reactions to the loss of family members* : These are referred to as grief reactions. The reaction is very similar to that seen in the family member of a deceased person. However, the difference here in the members affected, the unexpectedness of the deaths and the lack of supports from other relatives as they themselves are going through the same experience. The expression is mainly in the form of depressive features.

3. *Emotional Reactions to Physical Problems* : Physical problems affecting the lungs is the most significant. In addition there are complaints relating to the eyes, the genito-urinary systems in women. These are a mixture of both physical and emotional complaints.

At Bhopal, in comparison to the total emotional needs of the affected population there is very limited specialists help. This is the chief reason for organising this training for all the Medical Officers involved in medical care of the affected population.

In the next six days, efforts will be made to provide an orientation to understanding human behaviour, the different types of mental disorders, the emotional reactions to disaster in children and adults. Final section of the training will be directed to enhance the management skills. The overall effort is to increase the availability of mental health care to the affected population on a continuous basis to alleviate their suffering and improve their quality of life.

Emotional Reaction to Stress

In life, one faces different types of stresses of varying severity. It is well known that life stresses play a significant role on the health of individuals. Different people have different abilities and resources to cope with stress. Reactions to stress vary not only with the individual but also with the nature and severity of the stress itself. In general it is true that the more severe and chronic the stress situation, the greater would be the degree of disturbance to the individual.

The individual variations are largely dependent on the 'Personality' of the individual. The individual's personality in turn is determined by a series of factors which start operating quite early in life. The genetic or hereditary endowments constitute the substrate on which various environmental factors interact. Early childhood experiences, the influence of parents and significant others the home and school atmospheres and several socio-cultural factors contribute to the development of personality. The ability of an individual to cope with and adjust to life stress is also dependent on the social support system available to him. When conditions of overwhelming stress occurs, even normal well adjusted individuals with stable personalities can get emotionally disturbed.

This section deals with the psychological and behavioural disturbances which can affect large number of persons exposed to sudden severe stress. There are several accounts of the psychological sequelae of overwhelming and terrifying catastrophes, which have occurred in different parts of the world and in different socio-cultural settings during the past several decades. They have been variously termed as follows: Disaster, syndrome, Traumatic neurosis, War neurosis, KZ syndrome, (from the German word for concen-

tration camps) and Post-Traumatic stress Disorder. The disasters reported include natural catastrophes like earth quakes, fires, floods, accident like explosions, shipwrecks, plane crashes and man made disaster like wars bomb explosion, racial and communal violation. Many of these situations produce continuing chronic stress for the affected population and long term consequences. In addition, there are also reports of situations of prisoners of war, soldiers in combat and the large number of people who survived the Nazi concentration camps. You are perhaps familiar with the most disastrous of them all namely the second world war with all its consequences which ultimately culminated in the atom bomb explosion in Hiroshima. There are many other lesser known disasters the consequences of which have also been systematically studied. The Cocoanut grove Nightclub Fire which occurred in Boston in 1942, the Buffalo creek dam breach which occurred in 1972, the Spokijie earth quake which killed over 1000 persons and injured over 3,300 the Beverly Hill supper club fire in 1977 are few of these disasters whose psychiatric complications were systematically studied. In India, at Bangalore, the sequelae of the Venus circus fire of 1981 has been studied and followed up for four years.

A review of many of these accounts show that there is a great similarity in the emotional reactions of people to these disasters in spite of their being very different in nature, severity, sociocultural and geographical setting. The extent of emotional disturbance following a disaster appear to be widespread. For example, over half the survivors of the Boston Cocoanut grove Night club fire required treatment for severe psychological shock. The emotional responses of the people of the disaster area have been described in stages termed variously

by different authors. In sudden severe disaster, initially there is the stage of shock which affects most of the people. The victim is 'stunned' 'dazed' and 'apathetic'. He becomes inactive, non-responsive, docile and indecisive at times becoming intensely fearful. He is unable to function in an integrated manner. Some persons may develop bizarre, inappropriate behaviour or hysterical reactions. In certain extreme cases individuals may become disoriented and confused or stuporous.

Certain circumstances which present close encounter with death, can overwhelm the individuals basic sense of safety and security leading to panic reaction with 'flight behaviour' to escape the imminent death. The suddenness and severity with which the disaster strikes, often take the people by surprise who have no pre-arranged plan for dealing with it. The panic behaviour can become highly contagious leading to irrational behaviour and a 'struggle for existence'. It is reported that in a theatre fire in the United States (Chicago 1903) five hundred people were killed in less than eight minutes due to trampling and asphyxiation rather than to burns. In the Boston Coconut Grove fire too, the number of people killed would have been much less if they exited in an orderly way without jamming the doors.

Following the immediate response of 'shock' is a stage where individuals become passive and dependent on others. They become suggestible and are willing to listen to others. Their inability to deal with the situation continues and some authors have described their behaviour to be 'childlike' during this period. People are pre-occupied with the implications of the disaster to themselves, their family members and their community. The search for safety continues and people co-operate with rescue and relief operations. During this phase while many people return to normal functioning, it has been reported that some may show psychopathic behaviour

like looting, heavy drinking and rape, and other irrational behaviour.

The recovery stage lasts for weeks, months or even years. There is a general feeling of fear and apprehension lasting for varying periods of time but most people gradually regain their emotional equilibrium. During this stage, commonly there are widespread fears about recurrence of the disaster or new disaster occurring. This is particularly a period when all sorts of rumours spread like wild fire adding to the existing fear.

Many individuals who survive the disaster present with a typical constellation of symptoms which is often referred to as the 'post traumatic neurosis'. The basic feature of this syndrome, is anxiety. Anxiety may be generalized and mild, present most of the time. In addition, there may be several episodes of intense acute anxiety (panic attacks) during the day and night. These episodes are characterized by recall of the disastrous event extreme degree of fear feeling of insecurity, fear that the event could occur again, restlessness, bodily complaints like beating in the chest, breathing difficulty, tremulousness and abdominal discomfort. In addition, the individuals who suffer from this syndrome would have a series of other complaints as follows:-

Generalized weakness and tiredness, easy fatigability and inability to work, impaired concentration, forgetfulness, preoccupation, disinterest in allround activities, sleep disturbances of varying severity, recurrent dreams and nightmares which closely relate to the event, disturbances in appetite and eating pattern, various somatic complaints involving different systems of the body — aches and pains, respiratory and gastrointestinal distress, weakness etc. disinterest in sex, change of pattern in social and recreational activities. Many sufferers have an urge to repeatedly talk about and relieve the catastrophic event although

it can be very painful. During these repeated discussions, they could be quite critical of the relief measures undertaken by Government and other agencies. They could be critical of their own actions before, during and after the event. While this is true of some people, others try to avoid any thoughts, talk or reminders of the event and may even deny the reality of the experiences and the consequences of the event.

In individuals who suffered various types of bodily and physical injuries and illnesses during the disaster, the symptomatology can be complicated by the presence of emotional symptoms described above. Often, there can be problems in establishing the correlation between the symptoms which the individual reports and his actual physical illness. The symptoms are likely to be more numerous and severe than can be explained and understood by the injury or disease (Refer to section on 'Emotional reactions to physical illness'.)

The most severe emotional consequences of the disaster occurs in people who are faced with death of loved ones. In these cases, in addition to many of the above mentioned symptoms, intense feelings of depression and grief are present. Vivid memories of the person and the disaster feelings of guilt, death wish and suicidal ideas and an extremely pessimistic vision of future are also present. The sleep disturbance is more marked. These symptoms disable the individual to a great extent. In many persons, these are other changes too. Their attitude towards life and god changes. The strong feelings of guilt, when present, are centred around a sense of having failed to protect near and loved ones who died or were seriously injured in the disaster (refer to section on Grief Reaction).

Many persons who develop any of the above described symptoms of post traumatic syndrome, are likely to become chronic sufferers,

often with addition of severe symptoms. Studies carried out on persons who underwent severe emotional stress during various civilian disasters as well as during II world war, Vietnam and Korean Wars, and Nazi concentration camps have shown that symptoms like fatigue, lack of initiative, sleep disturbances, feelings of anxiety and depression, irritability, inability to concentrate, impairment of memory, feelings of inadequacy and various bodily complaints persist for a very long period. Damage suits and possibilities of monetary compensation may not have any major role in the precipitation and perpetuation of the post-disaster syndrome in the large majority of cases.

Management : Concepts of mental health and mental health professionals have a role to play in all phases of a 'disaster'. It may not, often be possible to organize immediate care for large number of persons affected in the acute phase but the later complications of grief or depressive reaction, post traumatic neuroses, emotional problems of those physically affected and emotional disturbances in children should always be adequately cared for. The fundamental approach to relief for the disaster victims should be an integrated one of physical, psychological and social.

While the percentage of persons requiring specialist psychiatric help for long duration may not be very high, large percentage of the population will be in need of simple supportive psychotherapeutic help. Establishing effective rapport with those who are disturbed and listening empathetically to them will be the first step. Helping them to narrate and relieve their experiences several times may be valuable. Apart from helping individuals, efforts must be taken to assist the community as a whole to cope with the large scale death, disablement and material loss.

Industrialisation: The Darker Side

Anil Agarwal and Darryl D'Monte

The process of industrialisation as a whole is an extremely hazardous one and what happened in Bhopal is only the tip of the proverbial iceberg. In fact, say the authors, the basic premise that the current model of industrialisation denotes progress and modernisation needs to be re-examined.

In all poor countries, the process of industrialisation is seen as benign and beneficent, the path to progress and modernisation. It is only a tragedy on the scale of what happened in Bhopal that exposes the ugly face of industrialisation. Even though the Bhopal disaster has been followed up by dozens of editorials and articles in Indian and foreign newspapers calling for the more efficient control of hazardous industries and hazardous products like pesticides — some even calling for their ban — the point that the industrialisation process as a whole is an extremely hazardous one, has neither been adequately made nor understood.

What happened in Bhopal is simply the proverbial tip of the iceberg that has penetrated into a highly biased public view, which seldom focusses on the problems of the poor and of the workers who work in mines, in factories and in agricultural fields. For these people, industrialisation has meant steadily increasing hazards and increased destruction of natural resources like rivers and forests which sustain tens of millions of people. And, as far as these trends are concerned, it matters little whether the industry is in the private sector or in the public sector or controlled by Indian or multinational interests. Each of these groups has its own vested interests and manner of operation.

Industrialisation poses hazards in several ways. The first hazard it poses is through the

highly dangerous work places it demands and creates. Probably the most callous sector is the mining sector — a major source of fuel and raw materials for industry — and most of it is in public hands. Accidents occur with frightening regularity in mines. No one knows till today precisely how many miners died in the Chasnala disaster in Bihar. Equally, there are hazards to those workers who produce power — another major input to industry — from both coal and nuclear stations.

If the plant had been in the public sector, Chief Minister Arjun Singh would probably have dismissed the now famous journalist Rajkumar Keswani (who warned about the dangers of the plant) for his then sensational articles as "anti-national". Industries themselves pose enormous hazards to their workers — from accidents, explosions and fire hazards to gassing and exposure to dangerous chemicals. The Indian Chemical industry — the most hazardous of all industries — has had a phenomenal growth in India since Independence. There are today an estimated 4,000 chemical factories with an investment of over Rs. 3,000 crores and employment of 3.8 million. The chemical industry accounts for 20 per cent of fixed assets in industry and produces more than Rs. 6,000 crores worth of goods every year.

The alkali industry has grown ten-fold since 1947. With a total licensed capacity of 78,000 tonnes, India is the largest manufacturer of pesticides in the whole area comprising South Asia and Africa. The total dye stuffs production in India during 1975 was around 18,500 tonnes and is expected to increase 2.5 times to 46,000 tonnes by 1980. As many as 139 organic chemicals, heavy metals like zinc, lead, chromium, copper, mercury and moly-

benzene and their compounds, and various acids and alkalis are used in manufacturing industries. Indian industry uses toxic substances that can cause allergies, damage the reproductive system, produce malformations in unborn children, damage the brain, liver and kidneys, produce eye, lung and skin diseases, and can cause or promote cancer. Statistics on injuries and deaths in industries are highly inadequate but those that exist show that the chemical industry kills more workers every year than any other industry — 100 workers were killed and about 11,000 injured in chemicals and chemical products industries in 1980. The biggest cause of death was explosions.

Toxic Wastes :

The second hazard that the process of industrialisation poses to society is through the toxic wastes that it generates and regularly releases into the environment. With industrialisation, this danger will steadily grow. The dumping of industrial toxic wastes is today the biggest environmental issue in the U.S. There are today 22,000 hazardous and toxic wastes sites in the U.S. and, in August 1984, the U.S. congress voted to increase the "super fund" to £ 10 billion to clear up these sites over the next five years.

The disposal of toxic wastes into the Indian environment is also growing rapidly. Paper and rayon industries use large quantities of caustic soda and soda ash. A Japanese team of environmentalists working with the Minamata Bay victims, which recently visited India, was shocked to find that many chloralkali plants in India are still based on the old process using mercury. This process was discarded in Japan after the horrific Minamata disease was discovered in 1960s. The country imports around 200 tonnes of mercury, of which 180 tonnes are used by the chloralkali industry alone.

Incidence of Minamata disease has not been reported in India but this may only be because

nobody has yet looked for this disease. Indian scientists are well aware that the mercury load in estuaries and water sources near chloralkali, paper and rayon firms in India has been increasing. The dyes and pigments industry also releases substantial quantities of toxic waste into the environment. Some of the organics and intermediates used in this industry are known to be highly toxic and the incidence of bladder cancer has been found in workers of the dyestuffs industry in India.

Toxic waste disposal methods in India are still very primitive. Generally, the dyes and pigments industry neutralise the toxic wastes with lime and the neutralised effluent, which is still highly toxic, is discharged with little or no treatment. The sludge and other solid and semi-solid wastes are disposed off on fallow public land. "No data on the effects of such disposal are available," says a report from the National Environmental Engineering Research Institute (NEERI).

The chances of these toxic chemicals reaching ponds, rivers and ground-water, and contaminating drinking water sources, are high. The sludge from the waste treatment plants to DDT manufacturing units contains an estimated 14 tonnes of DDT annually. These wastes, too, are dumped in low-lying areas from where they leach out to pollute both ground and surface waters. Wastes from organic chemical units are also dumped on fallow land.

Danger-ridden scenario

From a toxic hazards point of view, petrochemical, coal and ethanol based organic chemical complexes are the most potent sources of established mutagenic and carcinogenic chemicals. Plastics, polymers, artificial fibres, synthetic dyes, drugs and pharmaceuticals and pesticides are industries which use these chemicals. All these industries are expected to register significant growth rates in the next few decades.

A massive and uncontrolled explosion of the type that occurred in Bhopal releasing toxic gases and fumes is rare only in terms of its scale. Several explosive accidents have occurred during the storage and transport of chemicals. Except for newspaper reports, there is no proper documentation of such accidents. A major accident occurred in Delhi only in September 1984, but it failed to attract continuing press attention presumably because nobody died. Toxic gas and fumes spread over an area of one Sq. Km. following an explosion in a godown. Two school children fainted and two labourers engaged in the godowns received burn injuries.

Since the Bhopal incident India newspapers have reported several other incidents of accidents in which people have been killed. First, three people died and three others were taken critically ill when a liquid ammonia tanker collided with an empty oil tanker near Chandigarh. A week later, a one year old girl died and three others sustained injuries when a tanker carrying sulphuric acid turned turtle near Baroda. About a fortnight later, 47 people were seriously affected when two chemicals got accidentally mixed in a factory near Cochin releasing large quantities of chlorine. Reports of similar incidents have poured in from all over the world.

Add to this danger-ridden scenario, the transport of radioactive wastes from nuclear power stations in Rajasthan to spent fuel reprocessing units in Maharashtra and the transport of recovered plutonium from there to a fast breeder reactor in Tamil Nadu—all of which should start coming true within a few years.

The third hazard that industrialisation poses to society is through the use of chemicals that it promotes in daily life. Chemicals are now readily added to our daily food, especially industrially processed and packaged foods from milk to tomato sauce. Detergents, cos-

metics, paints and many other of our consumer products are based on chemicals, so are our medicines. Use of chemicals in the modern human's life is so extensive and pervasive that some environmentalists have even described this as "the chemicalisation of our entire lifestyle".

Industrialised agriculture, more popularly known as the green revolution agriculture, has promoted an extraordinary use of dangerous chemicals in the form of pesticides and fertilisers. Pesticide residues now appear in all varieties of foods like fish, fruit, vegetables and milk and often expose human populations to acutely dangerous chemicals. The first report of poisoning with pesticides came from Kerala in which some 100 people died after eating wheat flour contaminated with parathion. Since then, more than 25 incidents have occurred due to insecticide poisoning affecting anywhere from a few individuals to large groups. Many hundreds of smaller incidents could have gone unrecorded.

In Andhra Pradesh, a large number of villagers contracted the now well-known "hand-goddy syndrome" after eating pesticide-contaminated crab meat. Extensive use of synthetic fertilisers can also cause serious environmental pollution. Levels of fluorine and cadmium tend to build up in soils treated by phosphatic fertilisers for instance, and these toxic elements can be accumulated in dangerous quantities by food crops. "With an expected consumption of 1.3 million tonnes of phosphate fertilisers by 1983-84, there is need to compute the load of cadmium pollution from this source," says C.R. Krishna Murti, a former director of the Industrial Toxicological Research Centre in Lucknow.

What is amazing is that we know so little about all the chemicals we use. The world today uses some 50,000 to 70,000 chemicals. A recent U.S. study indicated that no toxicological information whatsoever is available for

about 80 per cent of all chemicals and not surprisingly, these chemicals keep shocking us with their fatal properties.

The fatal effects of methyl isocyanate (MIC), the gas that killed over 2,500 people in Bhopal, were little known to scientists until the disastrous event. No fatality was recorded until then. And even today, MIC would be, relatively, a far safer chemical than many others used in industry. In fact, the closely-related compound, toluene diisocyanate (TDI), which is used far more extensively in the plastic industry for making foams, has a permitted exposure level that is four times more strict than that of MIC, that is five parts per billion, equivalent to a few drops in an olympic size swimming pool.

Safety measures :

If these be the danger, what do we do? The first response, of course, would be to institute greater controls—through rules, regulations and legislation — and undertake safety measures with greater stringency. But there will be enormous political, social and technical problems in doing this. Safety is not something in which anyone necessarily wants to invest. Regulatory authorities must insist that safety measures be undertaken. But this will require, as one commentator has pointed out, a certain culture of political discipline. Otherwise, however many laws and rules there may be, safety measures will never be taken. A former member of the Monopolies Commission has even said that the Bhopal plant should teach a lesson to all those who preach economic liberalisation and carefully scrutinised licensing of industry must continue.

It is not that the government is unaware of the problem. Speaking at the first meeting of the National Environmental Advisory Committee in mid-1984, Dr. T.N. Khoshoo, Secretary to the Department of Environment, had clearly pointed out the growing problem of toxic substances. "If we don't get a national

policy on toxic hazards, we will soon have situations worse than Love Canal in the U.S. Dr. Khoshoo had said (Love Canal is a hazardous waste dump near the Niagara Falls on which houses were built and where people began to fall acutely ill 20 years later). With Bhopal — the world's worst industrial disaster-coming only a few months after, these were prophetic words indeed.

The department had already submitted to the licensing authorities a list of hazardous industries and siting guidelines which stipulated that hazardous industries must not come up near populated areas. The Ministry of Industry, however, not only allowed the Bhopal factory to continue but also permitted its expansion in 1984.

The Ministry of Industry's callous disregard for safety apart, it can still be asked, can siting regulations function in a country like India? Cities in the third world are far more rapidly growing and dynamic entities than cities in the West, where zoning regulations originated. Zoning requires an affluent population with access to efficient transport facilities. Even in an affluent city like Delhi, a sizeable fraction of the urban population cannot afford the subsidised public transport system. Human settlements experts have repeatedly found that slums come up where work opportunities are, and usually at a great speed. Urban planners can only declare them illegal but find them extremely difficult to control. People and hazardous plants will continue to, in all probability, live together. In the name of siting regulations for hazardous industries. It is more likely that poor people will be removed than the factories themselves. An industrialist has already made a public plea to this effect.

Indian regulators only have two choices in front of them. If they must allow the building of hazardous factories, then the installation of safety systems must be given top priority, overriding all economic considerations. Or

they should not allow the building of such factories at all.

The right to know

If the first option is chosen, human and environmental safety is clearly too important a subject to be left to safety regulators alone. Together with this, people must acquire the full right to know what factories are being sited and where, why and what dangers they pose to people, including the precautions to be taken if any. Only when people know, will there be a public pressure for safety and a regular response from regulators to give a high priority to it. Otherwise, in the overriding desire for industrialisation, and in the desire to make profits through short cuts, safety will be repeatedly overlooked.

The right of the people to know is particularly important in a society like India's where most producers of scientific knowledge are under the control of the government, which can turn off all flow of information needed by the public, especially in adverse circumstances. Scientific institutions in the developing world have largely grown under the auspices of the government. Investment in science has a long gestation and private industries, looking for short-term profits, have generally not shown much interest in scientific research. For this reason, the government's investing in science has been seen as a progressive and forwardlooking move.

But excessive government control creates the danger of political and bureaucratic control over information. There is a definite need today to democratise access to information so that people can become full partners in decisionmaking. Any sensible democratic government should welcome and support such a trend. If, indeed more points of hazards have to be created in society, they must be based on informed consent and informed choice. Otherwise every interest group will try to exploit a society's ignorance for its own

ends. Multinational companies, for instance, have repeatedly exported banned drugs and pesticides and even entire factories to the third world. A few years ago, an American company had even bribed the Government of Sierra Leone to allow it to set up a dump for American industrial toxic wastes. Only when the information reached the public, was the project stopped.

At least a beginning in public interest "poison research" could be made even by the resource-starved voluntary sector. A substantial amount of safety information is already available publicly in western countries which can be readily collected and compared with Indian regulations and danger points thus identified.

Much of the research on unethical marketing of drugs has simply consisted of comparing drug labels collected from different countries in the world, and these exercises have been able to show up clearly how a drug like ancloxin (usually prescribed for nausea), which is not permitted to be sold to any woman who is pregnant or likely to become pregnant in the U.S. was actually being sold in India as good for morning sickness during pregnancy. Even a dozen people's "poison experts" who need not be little more than good science journalists, could help increase the information flow about dangerous plants and products enormously. Trade unions could even take the lead by helping to form such groups.

A new approach to development

A boarder question can also be raised at this stage. Do we really need this pattern of industrialisation which generates such a massive demand for toxic substances? Is control of poisons, while their use continues to grow the only option we have? Can't we get rid of many of these poisons completely?

It is interesting that few editorials or articles have demanded a ban on hazardous products

and factories. As one poetess put it: "There was no anger in any of the newspapers." Indeed there can't be, because the chosen development model demands more of these poisons. At most, there can be some anger against a foreign company which brought the hazardous industry to our shores and against a government that was not careful. But must of this anger will be false because all of us share the ruling development paradigm among western newspapers. The liberal Guardian has even tried to teach us the arithmetic of life and death after Bhopal: If pesticides have killed a few thousands in Bhopal, have they not saved millions from starvation, the paper has asked.

To ban these substances will require a new approach to development in this country. Theoretically, it is indeed possible. It will require carefully thought-out lifestyle and technology choices. A number of poisons can then be easily discarded. There is no reason why there should be such a demand for plastic or detergents, for instance, which demand dozens of poisonous chemicals for their manufacture which then pollute the environment and endanger human health.

In agriculture, too, there is really no need to rely so heavily on a highly input, intensive crop production strategy. On the contrary, through land reforms, caring for the land through soil conservation measures, building small water harvesting systems like tanks and ponds, planting multipurpose food, fuel and fodder tree species, setting up integrated systems of animal husbandry, aquaculture, crops and orchards, our rural villages can be turned into highly productive ecosystems of food-fuel-fish-fertiliser-fodder biomass. The need for chemical fertilisers and pesticides could thus be considerably reduced and, if possible eliminated.

Therefore, our options are not limited to all powerful bulldozing chemicals. But change will definitely require a wholistic approach to people's problems and people's participation in both management of resources and generation of technology to meet their needs.

This will also require, as Hindi poet Raghur Sahay puts it, a culture of *anusandhan* (research and discovery) and not of *anukaran* (blind imitation). The Bhopal factory, he rightly claims, is a symbol of that imitative culture, which is not only highly destructive of our ecology but also of our society. Controls on this culture can help only to a limited extent.

Previous Accidents in Bhopal Plant

The history of Union Carbide's Bhopal plant is chequered with accidents:

—The alpha-naphthol storage area had a huge fire on November 24, 1978 which could only be controlled after ten hours; it resulted in a loss of about Rs 6 crores (\$5 million).

—Plant operator Mohammed Ashraf was killed by a phosgene gas leak on December 26, 1981.

—Another phosgene leak in January 1982 caused 28 persons to struggle between life and death for several months.

—Three electrical operators were severely burned while working on a control system panel on April 22, 1982.

—On the night of October 5, 1982, methyl isocyanate escaped from a broken valve and seriously affected four workers. Several people living in nearby colonies also experienced burning in the eyes and breathing trouble due to the exposure.

—Plant operator Shabbu Khan's hand got caught in a conveyor belt on October 14, 1982.

—Two similar incidents were also reported in 1983.

HISTORY OF UNION CARBIDE

In India

Union Carbide has a long history in India:

—Assembly of dry cell batteries prepared in England started in Calcutta in 1924.

—Production of dry cell batteries started in Calcutta in 1940.

—Another dry cell factory was set up in Madras in 1942.

—A flashlight manufacturing plant was set up in Lucknow in 1958.

—An arc carbon plant was set up in Calcutta in 1965:

—Another dry cell plant established in Hyderabad in 1917.

—Setting up of pesticide plant in Bhopal started in 1969.

Electrolite manganese dioxide factory put up in Bombay in 1971. During 1983, Union Carbide India Ltd (UCIL) had sales of Rs 210 crores (\$ 180 million), half from dry cells. Chemicals (including pesticides) accounted for one twentieth of this total. After taxes, the company made a profit of about Rs 15 crores (\$ 13 million) in 1983.

In Bhopal

A pesticide plant was begun by Union Carbide at Bhopal in 1969. In December 1984, there were about 600 regular and 300 contract workers in the Bhopal plant.

—The first batch of methylisocyanate (MIC) was imported from America in 1973 for experimental purposes.

—The first production of 321 tons of pesticide Sevin took place in 1977.

—With an investment of Rs 30 crores (\$17 million), a modern research and development center was started by Union Carbide in Bhopal in 1976. The entire research work is kept highly secret. The center is tax-exempt.

—After spending Rs 10 crore (\$ 19 million) in foreign currency, an alpha-naphthol plant was set up in 1970. However, it has done no production so far, and alpha-naphthol is still imported from the USA for pesticide production.

—A unit to manufacture MIC was set up in 1980. The production of pesticides based on MIC was 4704 tons in 1981, dropping to 2308 and 1657 tons during 1982 and 1983 respectively.

ANNOUNCEMENT

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**Director
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