Checklist for Fire and Explosion Risk

- Are flammable materials present in smallest possible amount ?
- Is any material liable to spontaneous combustion ?
- Would spilled liquids run into other areas ?
- Is waste material cleared up and removed regularly ?
- Does any machine run hot ?
- Is there anything to cause fire in risk area like spark, flame, excessive heat ?
- Can you get out quickly ?
- Can all escape doors be opened from inside ?
- Are all gangways, staircases, escapeways clean and in good condition and open ?
- Has everyone been instructed in precaution about flammable material in escape drill ?
- Can you raise the alarm easily ?
- Has the fire alarm been tested recently ?
- Can you hear it everywhere, even in toilets ?
- Is there a telephone near by ?
- Are there enough fire extinguishers ?
- Are extinguishers checked regularly and maintained ?
- Are fire alarms working ?

ENVIRONMENTAL REVIEW OF INDUSTRIAL PROJECTS EVALUATED BY DEVELOPING COUNTRIES

By Barry I. Castleman and Grace E. Ziem

Any developing country can require every foreign investor to submit as part of the application to build industrial factories, mining operations, and other industrial projects in the developing country, the necessary information on the possible harm these projects may cause to the health of developing country workers and people living in areas where the industrial projects would be built. Another objective is to assure that these operations will achieve high standards of performance; specifically, the developing country government will be provided with equipment to assure that workers' exposure to health and safety hazards does not exceed specified limits, and that releases of toxic substances into air and water and onto land do not exceed limits specified in the cooperative investment agreement between the developing country and the foreign investor.

Leading global corporations, have issued policy statements on health, safety, and the environment within the past year. One theme of these policy statements is that the companies now say they will meet the same high standards worldwide that they are required to achieve in their home countries in all new projects.

INFORMATION FROM FOREIGN INVESTORS FOR ENVIRONMENTAL REVIEW

A. The foreign investor shall provide an Environmental Impact Analysis of the proposed project,including:

1) list of all raw materials, intermidiates, products, and wastes (with flow diagram);
2) list of all occupational health and safety standards and environmental standards (wastewater effluent releases, atmospheric emission rates for all air pollutants, detailed description and rate of generation of solid wastes or other wastes to be disposed of on land or by incineration);
3) plan for control of all accupational health and safety hazards in plant operation, storage, and transport of potentially hazardous raw materials, products, and wastes;
4) copy of corporation guidelines of the foreign investor for conducting environmental and occupational health and safety impact analyses for new projects;
5) manufacturer's safety data sheets on all substances involved.

B. The foreign investor shall provide complete information on locations, ages, and performance of existing plants and plants closed within the past 5 years in which the foreign investor has partial or full ownership, where similar processes and products are used, including:

1) list of all applicable occupational health and safety standards and environmental standards, including both legal requirements (standards, laws, regulations) and corporate voluntary standards and practices for the control of occupational and environmental hazards of all kinds;
2) description of all cases of permanent and/or total disability sustained or allegedly sustained by workers, including workers' compensation claims;
3) explanation of all fines, penalties, citations, violations, regulatory agreements, and civil damage claims involving environmental and occupational health and safety matters as well as hazards from or harm attributed to the marketing and transport of the products of such enterprises;
4) description of the foreign investor's percentage of ownership and techonology involvement in each plant location, and similar information for other equity partners and providers of technology;
5) names and addresses of governmental authorities who regulate or oversee environmental and occupational health and safety for each plant location;
6) explanation of cases where any plant's environmental impact has been the subject of controversy within the local community or with regulatory authorities, including description of the practices criticized and how criticism was resolved in each case;
7) copies, with summary, of all corporate occupational health and safety and environmental audits and inspection reports for each location, including such audits and reports by consultants;
8) copies of safety reports, reports of hazard assessment, and risk analysis report carried out with similar technology by the foreign investor and its consultants.
9) copies of toxic release forms that have been submitted to governmental bodies (e.g., the U.S. Environmental Protection Agency or similar agencies in other countries) within the past 5 years, for all plant locations;
10) any information considered relevant by the foreign investor.

AGREEMENTS ON POLICY

C. The foreign investor shall submit a statement of corporate policy on health, safety, and environmental performance of worldwide operations. This must include the corporate policy on laws, regulations, standards, guidelines, and practices for new industrial projects and production facilities. The foreign investor shall explain how its global policy is implemented by: describing the staff responsible for carrying out this policy, its authority and responsibilities, and its position in the foreign investor corporate structure. Such descriptions will also include the name, address, and telephone number of senior corporate management officials in charge of this staff function. The foreign investor shall state whether it follows the same standards worldwide for worker and environmental protection in all new projects; and if not, explain why not.

D. The foreign investor shall agree to provide the developing country immediate access to the proposed industrial facility at any time during its operation to conduct inspections, monitor exposure of workers to hazards, and sample for pollution release.

E. The foreign investor shall agree to fully train all employees exposed to potential occupational hazards, including potential health effects of all exposures and the most effective control measures.

F. The foreign investor shall agree to provide the developing country with equipment to analyze workplace exposures and pollutant generation, including but not limited to all limits specified in A.2) above, for the lifetime of the proposed project. The foreign investor shall agree that the proposed project will pay the cost to the developing country government for all medical and exposure monitoring during the lifetime of the proposed project.

G. The foreign investor shall agree that the proposed project will fully compensate any person whose health, earning capacity, or property is harmed as a result of the project's occupational hazards and environmental impacts, as determined by the government of the developing country.

H. The foreign investor shall follow marketing safeguards as restrictive as those it applies anywhere in the world, to assure that workers and members of the public are not harmed as a result of the use of its products.

I. If the foreign investor becomes aware of a substanital risk of injury to health or the environment from a substance it manufactures or sells in the developing country, a risk not known and disclosed at the time of this application, the foreign investor agrees to notify the environmental protection agency of the government of the developing country immediately of such risk. (This is similar to requirements under section 8c of the Toxic Substances Control Act of the U.S.A.)

J. The foreign investor shall provide the names, titles, address, phone, and fax numbers of its senior corporate officials charged with implementing environmental and occupational and safety and health policies including plant design and operations, corporate inspections and reviews of plant performance, and product stewardship.

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FRCH NEWSLETTER

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Occupational Health: Some Issues

Vijay Kanhere

"ALMOST all the agents that have been recognised as being carcinogenic in humans, have been identified as such in the occupational setting",—Encyclopaedia on occupational health and safety by the ILO.

The greater the number of chemicals used in industries, the greater are the number of affected persons. The effects of chemicals in their acute form are obvious. Thousands of persons affected due to MIC in Bhopal, posed a grave problem to community health. And what about the workers in the factory, who were slowly and regularly being affected not only by MIC, but also by other chemicals like phosgene? Are not the workers also a part of the community?

Let us take the example of silicosis. It is usually treated as tuberculosis. This has happened in Mandsaur in Madhya Pradesh and Baroda in Gujarat. Workers in Alembic Glass Works had to struggle for being treated as patients of silicosis. What is the effect of these patients on the community? Their lungs are affected, their resistance to disease goes down and they readily contract tuberculosis. This increases the occurrence of TB in their families and the community.

Noise pollution in the community has been widely discussed. It was a topic dealt with in a popular television serial as well. However, what is hardly ever mentioned is that workers are day after day, for years attacked by noise—in the textile mills, in engineering units, on boilers, compressors... As the hearing capacity of workers gets affected, apart from many serious possible accidents, their irritability increases. Within the family, it creates tensions. Everybody has to speak up so that the affected worker can understand. He/she too judges the capacity of others from his/her or own and so starts talking in a louder pitch, which irritates other family members in turn.

There are carry-home diseases such as asbestosis.

Chemicals reach homes through overalls, clothes, unwashed body parts and they affect family members. One ESIS doctor informed us that the majority of the cases he treats are those of dermatitis, induced by exposure to chemicals.

No longer can one think of occupational diseases as an exclusively urban problem. In Punjab and Maharashtra, there are areas where insecticides are sprayed aerially by helicopters. These insecticides affect agricultural workers and farmers. Chemicals used in agriculture are increasing at a fast rate. In rural areas, where residential areas and work-places are not sharply differentiated, the effect of these hazardous substances are going to be all the more.

The National Commission on Labour in its report in 1969 commented, "... the slow and agonising process of an occupational disease may not stir the community as much as it would in countries with chronic labour shortage, although to the near ones, it is a tragic occurrence. Relief gets organised soon after the event, but prevention gets side-tracked".

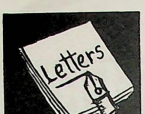
However, in countries like India, relief too takes a very long time. The Bhopal disaster made national and international news. However, almost 7 months after the gruesome event, conscious doctors had to move the Supreme Court merely to get the supply of the proper medicines. (Dr. Vohra Vs. the State, 1985). Even in a metropolitan city like Bombay, relief has not been effectively organised even in cases of chlorine leakages.

In fact very often it is even difficult to get diagnosed as a victim of an occupational disease. Workers suffering from asbestosis even in cities like Bombay, have to go through a tiresome process merely for being diagnosed properly as patients of asbestosis.

There are various reasons for this state of affairs. For one thing, any talk about health and safety at the workplace is seen as a direct threat to the profits as well as to the power of the management. This also relates to the lack of political will to take the health of the workers seriously. This reflects in the content and approach of the curriculum in medical colleges. Thus even the knowledge about 'notifiable diseases' is absent with most doctors, including those working in industrial areas.

This is glaringly brought forth in the fact that from the year 1960 to 1980, there was not a single case reported of 11 out of the 22 'notifiable diseases'. In this period only 30-32 cases of diseases have been reported per year, while, with a much better technological set-up in the factories, almost 20,000 cases of asbestosis are reported each year in the US despite better preventive measures.

From this it is obvious that the doctors can and must play greater role in learning about, diagnosing and reporting various industrial and occupational diseases. It is also necessary to make this information available not only to the industrialists and government agencies but more important to the workers themselves, their relatives and the public at large especially the poor who are most exposed to these hazards. This is one important weapon to stop the mindless and inhuman maiming of lives in this country.



To
The FRCH collective,

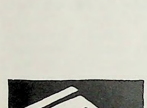
I acknowledge, with thanks, the receipt of the Bi-Annual Report of your Foundation and the latest issue of *FRCH newsletter.*

Both these publications bear your stamp and put forth loudly and clearly the messages that need constant re-emphasis in our country.

I must confess that I cannot agree with all that is said. Working, as I do, in a public hospital, full time, I see the need for such hospitals and for specialities such as mine. The poorest need excellent service no less than do the well-to-do and I feel that it is imperative that we keep our public teaching hospitals in the forefront of patient care. Unfortunately, these days it is the 5 star hospitals that are in the forefront, whilst the public hospitals are starved and downgraded.

Whilst there is no dispute regarding the need for efficient measures to improve public health, prevent disease, educate the population at large and generally do all that is possible to improve the economic status of the villagers in particular and labourers in general, I see the ill effects of these being pitted against development of the large teaching hospitals. I feel that this is wrong. BOTH NEED ATTENTION, DEVELOPMENT.

Sunil Pandya
Neurosurgeon
K.E.M. Hospital
Bombay



Notes from Medical Journals

Mukund Uplekar

Is our pursuit of a healthy body—a major threat to health?

Ivan Illich, a long time critic of the medical establishment no longer views doctors as the major threat to health. He has discovered a far more dangerous pathogen the pursuit of a healthy body. Once again we have found the enemy and once again he is us. Complacently we have stood by while a multimillion "health industry" has taken over, offering advice and handholding to the fibre eating health magazine readers whom the doctors are too busy to see. These new pseudoscientist healers diagnose yeast cells in the blood as a cause of your tiredness, and cure it with a garlicky remedy that only they sell. They analyse your hair to find out which mineral or vitamin you need to buy from them. They measure your body fat by pinching you with calipers; determine your skin's resistance and electro-magnetic balance with galvanometers; and perform stress tests, conveniently combined at health clubs with a massage, a sauna, or the whirlpool. Various "Cardiovascular" exercises are carried out perched on a stationary bicycle while hooked up to a pulse monitor that lights up as you reach the top of an imaginary hill.

How harmful are these practices other than wasting people's money? Illich rails against these "sundry holistic well-being programes" this "curious mixture of opinionated and detailed self care practices". He thinks this mumbo jumbo could cause even more harm than 100,000 patients being seriously injured each year by hospitalisation.

Antibiotics in Antidiarrhoeals

In 'Antibiotics: the wrong drugs for diarrhoea' Health Action International draws attention to the WHO statement that "antimicrobial drugs are not indicated for the routine of acute diarrhoea". Health Action International claims that spending on antidiarrhoeals (nearly $ 150 million a year) diverts attention and resources from oral rehydration which is a lifesaving treatment.

Products containing neomycin, streptomycin, chloramphenicol and sulfonamides are singled out as being the "worst of a bad lot". For example, widespread and irrational use of streptomycin has led to the development of bacterial resistance to the drugs for the treatment of tuberculosis. And despite the well recognised risk of bone marrow suppression, chloramphenical is present in 12 products.

Of the 12 regions surveyed, only Hong Kong has stringent regulations to prevent the registration of antidiarrhoeals containing an antimicrobial. The report will be sent to health ministries, drug regulatory agencies and medical schools around the world.

Interaction Between the Government, NGOs and the Private Sector in Implementation of HFA

Abhay Bang

1.**Ideological basis of cooperation**: The cooperation between the government and the NGOs in the health sector was always on the basis of common ideology and interests. Thus different categories of NGOs were collaborating at different times with the then ruling governments. Christian missions were actively cooperating with the British rulers with common imperial interests. The Gandhian constructive institutions were active in collaboration with the Congress government with their common roots in the freedom movement and 'Congress' ideology. The gates were opened for the voluntary agencies with closer links with the 'opposition' parties (when these came into power under the name of Janata Party) by allowing a major role to NGOs in the National Adult Education Programme. Now with the free market ideology of the Rajiv Gandhi government, the private sector shall have more role. The talk of social marketing, of delegating the responsibility of advertisement of the national programmes to private agencies are a few examples.

Where do the NGOs in the health sector ideologically stand today? Inspite of their tremendous diversity and different religious or economic roots, most of them explicitly or implicitly believe in the welfare state with a mixed economy. Obviously they do not find any major ideological problems in collaborating with the various governments in India. Even those who profess to have a radical ideology usually do not have problems in cooperating with the government as long as they can continue to attack the system while retaining their safe positions in the urban universities and institutions. Many other grass root workers or activists strive for limited reforms by opposing government policies; and yet in the long run they too work with the government as their reforms are accepted.

Thus most of the NGOs today have no major ideological barriers for cooperating with the governments in India.

2 *Role of the NGOs*: Inspite of hundreds of failures of implementation, the National Health Policy is more progressive than most of the NGOs. At least at the conceptual level, the Primary Health Care is oriented to prevention, outreach and use of paramedics, while most of the NGOs are still curative oriented, running charitable dispensaries or hospitals or diagnostic camps. Gone are the days of Albert Schweitzer or Father Demain when such individuals or NGOs outreached where no government care reached. The most important outreach agencies today are the government or the private practitioners. Thus in Gadchiroli district which is probably the most difficult district in Maharashtra, there are 3 NGOs in health, 34 PHCs, with 230 subcentres and 700 CHVs and about 300 General Practitioners (including Registered Medical Practitioners).

A recent study by FRCH on the NGOs in health in Maharashtra concluded that the NGOs are concentrated in the developed districts rather than the backward areas.

With the tremendous expansion of the 'government health sector or the private practitioners, what new role can the NGOs assume, especially if they want to increase their impact by interacting with the government which alone has the political responsibility and resources to provide HFA?

The following roles may be posible

1. Research and Innovation
2. Demonstration
3. Training
4. Evaluation
5. Building public opinion for changes in government policies.

While the last one is not cooperation with the government in the narrow sense, this role is extremely important. The history of public health is studded with examples as to how this role has greatly improved the government policies and programmes. The Sanitary Movement in Great Britain in the 19th century or the work of the environmentalists today are glaring examples. However, the rest of the discussion in this paper does not include this type of role.

3. *Issues in Government-NGO Interaction:* In any working together,compatibility on the following points is important, and hence needs attention.

1. Ideology and Goal
2. Objectives (specific)
3. Organisational structure and culture
4. Procedures and rules
5. Personalities
6. Finance

The *ideology and the goal* being similar, these don't pose much problems in the actual working together. But the different emphasis due to the different *objectives* may pose a problem. Down in the field, primary health care seems to be reduced to fulfilling targets of a few vertical programme objectives. Family planning (FP) tops the list with immunisation and blindness control coming next. Rest of the programmes or indicators like infant mortality count little. The NGOs may have different or broader objectives and hence a tussle for priority may ensue. A NGO may not be willing to go all out for the numerical targets of FP while for the government health officer, it is a sacred cow.

There is a contradiction in the *structure* and function of the Primary Health Care strategy. The National Health Policy has abandoned the unipurpose organisational structure. Now we have buildings and a large number of health workers so that an organisational basis is created for continuous and comprehensive health care. And yet, the health programmes are still conducted in the form of campaigns which need a mobile structure and large scale propoganda rather than buildings and accessible workers.

In its relationship with the government organisation a NGO is likely to face what may be called the *'middle level* constraint'. At the top, the officers can take a broader view about cooperation. The bottom level functionary may be happy to work with a.NGO because of more humane and

(continued on page 8)

Industrial Accidents: Whose Life, Whose Responsibility?

Sujata Gothoskar

EVERY five minutes, one of the world's workers is killed and fourteen permanently disabled as a result of accidents at work or occupational diseases, according to an estimate by the International Labour Organisation (ILO). In India, over the 30-year period from 1950-1980, 36,000 workers have been reported killed and 6.4 million injured in accidents at work in the factories in the organised sector, mines, ports, docks and railways *alone*. The number of workers killed or maimed in the unorganised industry can only be a guess. And over the years, statistics indicate that injuries due to industrial accidents continue to increase.

The number of fatal accidents has risen by 225 per cent in the last 30 years, from 248 in 1950 to 806 in 1980. Non-fatal injuries, equally dangerous *, have been rising even more rapidly, from 76,000 in 1951 to 355,000 in 1980—a 393 per cent increase.

Increase between the years 1950 and 1980

Increase in average daily employment	120 per cent
Increase in fatal injuries	225 per cent
Increase in non-fatal injuries	393 per cent

An international comparison also indicates that accident rates in India are exceptionally high. It is difficult to compare statistics for non-fatal accidents since criterion for reporting are different in different countries, but fatal accidents can more easily be compared.

The figures for India are based on accident reports received by the Factory Inspectorate, and therefore relate only to 'reportable' accidents, i.e. those which lead to an absence from work of two days or more.

Moreover, it is well known that even reportable accidents are very often not reported by employers, as they wish to avoid paying compensation or getting prosecuted for non-compliance with the law. And the law does not even cover construction workers or workplaces with power employing less than 10 workers and workplaces without power having less than 20 workers (and most contractors take care not to have more than 19 workers on any one site), so that some of the sections, which are subjected to most hazards—in small-scale industry, construction, contract workers, etc,—are not included in accident statistics at all.

Finally, these figures do not include the enormous number of people who are killed or disabled by occupational diseases. Taking this into account, it appears that a significant proportion of the total working population suffers from some form of injury, upto and including fatal injury, due to occupational hazards. In short, the situation is appalling, and it is getting even worse.

This points to the extreme urgency of monitoring accidents. This is of course not an easy task. Nevertheless most accidents cause immense misery to workers and their families and most accidents have a clear cause (i.e. they are not really 'accident'al at all) and this cause can be and has to be pinpointed and removed. This process of pinpointing and removing the cause of industrial accidents and occupational diseases has important implications.

*Every non-fatal accident has the potential to become a fatal one the next time it occurs.

Number of fatal injuries per million human hours worked

Countries	number in 1979	number in 1980
U.S.A.	0.03	N.A.
U.K.	0.03	0.03
Japan	0.02	0.01
Yugoslavia	0.07	0.08
India	0.15	0.15

To begin with, it puts a halt to deaths and mutilations of more workers. Secondly, it asserts that workers have a right to work without their lives or well-being being jeopardised. Thirdly, it gives workers the right to know and act in favour of their own safety according to the knowledge they have gained about the work process. Fourthly, it makes a political statement about the primacy of workers' safety *vis-a-vis* either management prerogatives or the blind profit motive.

Theories of Accidents

The standard explanation for most accidents is that they are due to either unsafe mechanical or physical conditions, or unsafe actions, or both. However, the actual causes of accidents cannot be attributed simplistically, but are much more complex, especially, if 'unsafe actions' are attributed, as they usually are, to workers.

For example, one could consider the accident at Union Carbide, Bhopal, in which Ashraf Khan was fatally injured. He was splashed with phosgene while opening a pipe for maintenance work, panicked and removed his safety mask before decontaminating himself, inhaled a fatal quantity of the toxic chemical and collapsed. The management took the position that it was his unsafe action—removing his safety mask—which resulted in his death. Yet the fact is that the pipeline was supposed to have been properly evacuated and put under vacuum, according to the company's own laid-down procedures. The pipe-line should have been empty. Ashraf had no reason to think he would be splashed with phosgene, and in the circumstances, his panic was an entirely normal human reaction. Thus to say that this accident was due to both an unsafe action and an unsafe condition is really to misrepresent its cause. If the design and processes cannot pre-judge and plan according to entirely human responses of the moment, clearly such designs and processes are at fault? As the safety manager at Siemens put it, 'the work place and work processes have to be not only full-proof, but also fool-proof. Even 'deliberate accidents' should be planned against in the original scheme itself. One did not even ask for that much in the Bhopal case.

Again, take the finding that contract workers have a higher incidence of accidents, especially fatal accidents.

For example, in a petroleum plant in Bombay, a contract worker, working in a pool of liquid which he believed to be water, threw a lighted match into it, it turned out to be oil, however, and he was burnt to death. This would be considered a clear case of an unsafe action but the cause of the accident was ignorance on the part of the worker. Thus to say that the cause of this accident was an 'unsafe action' would be completely erroneous, because to use untrained and uninstructed workers for work with hazardous chemicals is to create an inherently unsafe situation.

There are unlimited instances, indicating the fact that it is absolutely necessary to go beyond the superficial category of 'unsafe action' and investigate why the unsafe action took place.

Another theory explaining the occurrence of accidents, attributes the majority to a few individuals who are predisposed to have a high rate of mishaps. At three places out of twenty where we obtained interviews, one worker was identified as a victim of repeated accidents, and in a tyre factory and in the docks, there were a few such workers. But in most places, there were no such 'repeaters', and even in cases, where a few workers repeatedly had accidents due to drunkenness and negligence, they were far from accounting for even a significant proportion of the accidents.

Our findings were confirmed by other studies:

"Numerous studies carried out by research workers have failed to prove conclusively that any group of persons in a given sample can be separated as accident-prone. Dr. Schulzinger, after careful study of 35,000 injury cases, ... suggests that most accidents are due to the relatively frequent solitary experience of a large numer of individuals. The total number of accidents suffered by those who injure themselves year after year... is relatively small... Professor Edwin E. Ghiselli... advises that the term accident proneness should never be used in studies of the causes of accidents and injuries, as it is according to him "dangerous and misleading and contributes nothing of practical value to our understanding of the causes of industrial accidents and injuries". ('Accident Prevention' Industrial Safety, Health and Welfare Centre, Central Labour Institute, Bombay)."

If the accident proneness of a few individuals is not responsible for most accidents, are there other factors which are within the control of workers? Could there be, for example, self-infliction of injuries in order to get time-off from work? Or could a large number of accidents be due to the carelessness of workers?

Of those interviewed, not even management representatives thought that such causes could account for a significant proportion of accidents. Nor does it seem likely that workers would court death or mutilation if they could avoid them. Most of the accidents are such that even if the actual injury is minor, it could easily have been much worse—and therefore to inflict it on oneself would involve incurring the risk of serious injury or disablement. Our investigation shows that where workers do take such risks, it is for reasons beyond their control—e.g., because the work-situation itself forces them to do so, because they are ignorant of the dangers, because they are asked to do jobs for which they are insufficiently trained, and so forth.

On the other hand, the conditions and actions which routinely lead to accidents are within the control of management; and it is in recognition of this that most modern health and safety legislation lays the responsibility for providing a safe and healthy workplace on the employer.

This article is based on discussion and research work done for the Accidents bulletin: No. 10, of the Union Research Group, Bombay and the several discussions with Rohini, Vijay, Ram and Jairus, and going through their notes and jottings.

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Ban EP Drugs: An Appeal to SC

Ravi Duggal

The hearing of the Public Enquiry commissioned by the Supreme Court (SC) regarding banning of the highdose Oestrogen Progesterone (HDEP) combination was held on 14th July in Bombay. Like the earlier three hearings in Madras, Delhi and Calcutta it was also a farce.

The very nature of the enquiry needs to be questioned. The SC must look into this matter seriously because this sort of an enquiry is the first of its kind and is going to form a precedent. And a bad precedent would be both unjust and dangerous.

First of all the Drug Controller (DC) cannot constitute the authority to sit over such a hearing because it is party to the decision-making process (in this case banning or continuing the production and sale of HDEP). Given the political economy of our country, aptly illustrated by the Justice Lentin Commission's exposure of the Drug Administration of Maharashtra, the impartiality of the DC office cannot be assumed. The pharmaceutical industry is too powerful a lobby and the DC authority is highly influenced by the former. This was too obviously apparent during the proceedings of the various hearings.

The SC should also question the manner in which the concerned drug companies have gathered evidence in support of HDEP, when internationally its hazards are well recognised. It was amply evident during the hearings that most gynaecologists and other medical and pharmacological experts who submitted in favour of the drug companies did so for reasons other than their own belief, practice and conviction. The written submissions given by many gynaecologists and doctors are mere signatures on standardised statements obviously circulated by the drug companies.

Further, the entire focus of the public enquiry has been on technical issues relating to HDEP and the clever use of legal loop-holes. The DC and the drug companies, as well as their supporters, have completely ignored social realities that are crucial in making decisions concerning human lives. The panel conducting the hearing comprised only of "technical" persons from the DC's office. No social scientist, lawyer, gynaecologist, or representative of consumer and civil right groups were there on the panel. Worse still no woman was represented on the panel. Isn't it ironical and unjust that the fate of a drug consumed only by women is being decided by men who'll never have to experience the hazards of the drug! Why does it always happen that any question that involves women's rights, security and health is treated with neglect, carelessness and apathy? These shortcomings in itself make the nature of the enquiry questionable.

The most important issue that should concern this enquiry and has totally been overlooked is the nature of medical practice in India. In general the type of private medical practice prevailing in the country is grossly unethical and irrational. The checks and control by the Medical Council of India and the Drug control Administrations is virtually non-existent. One doesn't have to hunt around to gather proof for this. It is well known and documented. The Lentin Commission has adequately exposed the misdeeds of both the drug companies and the Drug Administration. The dangerous and misleading practices indulged by the medical profession in India to make a fast buck are well known. General Practitioners will administer injections, tonics, steroids and antibiotics for ailments like headaches and colds or give an intravenous drip of calcium gluconate to a patient complaining of tiredness. Gynaecologists will reconstruct hymens to reassure virginity, conduct sex-determination tests, help preselect sex of foetuses and do ceaserians and hysterectomies even when not required.

The prescription practices of an overwhelming majority of doctors is largely unethical and irrational and this is the danger that concerned people supporting the ban of HDEP fear most because HDEP is being grossly misused by doctors, like many other harmful and also relatively harmless drugs. I will not go into the misuses and hazard of HDEP because a lot has already been written and documented about this.

What should the supreme court look into? First of all it must scrutinise the adequacy and fairness of the enquiry. The general experience of the hearings has been that the fundamental basis of the enquiry was faulty and therefore the enquiry invalid. More thought needs to go into formulating the structure and nature of the enquiry. The SC must review this seriously because we don't want a poor and unjust enquiry to become a historical precedent. The SC must assure impartiality and justice—a properly constituted unbiased enquiry commission, that seeks independent evidence and is not an interested party to the decision, somewhat similar to the Justice Lentin Commission, should do an adequate job.

The SC should also immediately put into effect the earlier ban of HDEP that was made by the government on the recommendation of the Indian Council of Medical Research, the premier medical research institution in India. When many developed countries after bitter experiences have already banned or withdrawn HDEP on grounds of well known health hazards, associated with the drug then why wait for further evidence to ban the drug. Do we want another thalidomide type disaster? How can the SC and the government permit a known hazardous drug to be produced, marketed and consumed freely in the country? Even an iota of doubt about the harmfulness of drug is sufficient reason to ban it, especially considering social realities of our country. It is indeed inhuman to let loose a harmful drug on an uninformed and oppressed people.

Therefore it is important that the SC in reviewing this public enquiry should reassess the basis of formulating terms of reference and assure that social aspects of the concerned issues are taken into account adequately. And it is our fervent appeal to the Chief Justice of India to ban HDEP with immediate effect in the larger public interest.

PESTICIDE POISONING

Amar Jesani

Pesticide poisoning, including attempted suicide by ingesting pesticide, is a significant health problem, particularly in the third world countries. In our country reliable statistics on pesticide poisoning are very difficult to obtain, although there are some estimates and these suggest an increase in the number of people suffering from this problem. Of the third world countries, some studies are available from Sri Lanka. A survey covering hospitalised patients between the years 1975 and 1980 revealed that 79,961 patients were admitted due to pesticide poisoning, 6083 of whom died. Organophosphate compounds accounted for 76 per cent of these poisonings. Further, on analysing data for the year 1979 in this survey, it was found that 73 per cent of these cases were due to attempted suicide.

From the data of this Sri Lankan survey and others, certain new and disturbing medical aspects of organophosphate pesticide poisoning are emerging. The most commonly seen, and known symptoms include cholinergic crisis, with miosis, sweating, salivation, etc. This is treated with high doses of the anticholinergic drug atropine, cholinesterase reactivators (oximes) and pyridine.

In addition to this acute cholinergic-toxicity phase, observed in all cases of organophosphorous pesticide poisonings, some people suffer after two to five weeks of exposure, from a delayed peripheral polyneuropathy involving the *distal* muscles of the extremities. This syndrome is also known, though not properly documented in our country.

Recently, in the March 26, 1987 - issue of the New England Journal of Medicine, Senanayake and Karalliedde have described another new syndrome of the neurotoxic manifestation of the organophosphate poisoning. They observed,in 10 out of 95 patients (in Sri Lanka), muscle weakness after 24 to 96 hours after the cholinergic illness, involving primarily the proximal limb muscles, neck flexors, certain cranial motor nerves and the muscles of respiration. The effect on respiratory muscles is indeed very serious. Seven of these ten patients had difficulty in breathing and three of them died of respiratory failure. The authors have called it "an intermediate syndrome" and the condition does not respond to atropine and oximes.

This expansion in the clinical profile of the organophosphorous poisoning has very serious medical as well as public health implication, especialy in the third world countries where these pesticides are liberally used, carelessly packaged and dispensed and are the favourite of those who want to commit suicide.

Jeyratnam, J de Alwis, Seneviratne R. S., Copplestone J. F., "Survey of pesticide poisoning in Sri Lanka" Bull. WHO, 1982: 60: 615-9.

What is New?

Books

Flavin Christopher,' "Reassessing nuclear power: the fallout from Chernobyl".—Washington: World Watch Institute, 1987, pp.91.

Fukuoka Masanobu, "One—straw revolution: an introduction to natural farming".—Rasulia: Friends rural centre, 1986, pp.181.

UNICEF, "Learning together from the Sri Lankan experience".—Geneva: UNICEF, 1984, pp.112.

Zaidi Akbar S., "Issues in the health sector in Pakistan".—Islamabad: Pakistan institute of development economics, 1986, pp.20.

Mitra Ashok and Mukherji Shekhar, "Population, food and land inequality in India: 1971".—Bombay: Allied publishers, 1980, pp.112.

Eastman kodak company, "Information age technology".—Singapore: Addison—Wesley, 1986, pp.654.

India, Government of, "Health information of India: 1986".—New Delhi: Directorate general of health services, 1986, pp.292.

Ford Foundation, "Banwasi Sewa ashram (Anubhav: Experiences in community health)".—New Delhi: Ford Foundation, 1987, pp.32.

Reprints

Fulop Tamas, "Health personnel for health for all".—progress or stagnation (part 1):—WHO Chronicle, 40(5), 194-199, 1986.

WHO Chronicle, "Maternal mortality: helping women off the road to death".—WHO Chronicle, 40(5), 175-83, 1986.

British Medical Journal, "Measuring morbidity".—BMJ, 294, 263, 31st January 1987.

Maria Mies, "Why do we need all this? a call against genetic engineering and reproductive technology".—women's studies Int. forum, 8(6), 553-560, 1985.

Robinson Jean C., "Of women and washing machines employment, house work, and the reproduction of motherhood in socialist China".—China quarterly, 10, 32-57, March 1985.

Prakash Padma, "Sexism in medicine" (paper for 3rd national conference on women studies, Chandigarh.—pp.28, October 1986.

Barreto Luis (Dr.), "Unemployment among doctors: its roots in socio-economic development in India".—MFC meet, 10, January 78.

Duggal Ravi and Gupte Manisha, "XYZ of sex".—Indian post; 31st May 1987.

Awasthi Ramesh and Gupte Manisha, "Our destiny floats with the clouds".—Indian post, 14th June, 1987.

Duggal Ravi, "Why population won't fall".—Indian post, 13th June, 1987.

Duggal Ravi, "You can't blame third world all the time".—Indian post, 30th May, 1987.

Books in Brief

Manish Mankad

Indian Council of Medical Research, "Medicinal plants of India: Vol. 2".—New Delhi: ICMR, 1986, pp.600, Rs.136/-.

The need for a systematic compilation of data on medicinal plants in India has been felt by almost all research workers engaged in the study of medicinal plants. In 1976, Indian Council of Medical Research published a first volume comprising of information on nearly 350 species of plants presented in alphabetical order (A to G). The present 2nd volume extends the same (H to P). It provides in addition, separate indices for botanical names, chemical constituents as well as names of plants in English and regional languages of India. Further, classified lists of plants according to their pharmacological activities are furnished in one of the indices. This volume also contains coloured plates of plants.

World Health Organization, "Concepts of health behaviour research (Searo regional health papers no.13). New Delhi: WHO; 1986.

The global strategy for Health for All by 2000 recognised the need for health behaviour research (HBR). Despite this good start, research efforts in relation to national primary health care programmes were initially slow in recognising the need for and committing resources for social science research. HBR was needed to help reorient the planning and implementation of primary health care. This document defines the scope and future direction of HBR within WHO/SEARO. HBR is viewed as part of health systems research and an integral complement to all primary health care components.

Feminist review, "Sexuality: a reader".—London: Virago, 1987.

The book includes discussion of issues relating to sexual politics, the social construction of feminity and masculinity, psychoanalysis, lesbianism, pornography and representation, sexual violence and adolescence, with each article set in its time and context by a series of prefaces especially written for this volume.

Fukuoka Masanobu, "One straw revolution: an introduction to natural farming".—Rasulia: Friends rural centre. 1986, pp.181.

The author describes the events that led to the development of his natural farming methods and the impact that it has had on his land, himself, and the thousands of people he has taught. He feels that natural farming proceeds from the spiritual health of the individual. He considers the healing of the land and the purification of the human spirit to be the same process and proposes a way of life and a way of farming in which this process can take place. More than merely indicating methods, this book aims at changing attitudes: about nature, farming, food, human—physical and spiritual health.

(continued from page 3)

liberal treatment. It is at the middle level where the problem of rivalry and sharing of power arises and hence a great resistance or even hostility may start.

A maze of procedures and inscrutable *rules* which are characteristic of government functioning pose two types of problems. NGOs often understand the intricacies of these or can be easily trapped into immobility while working with these. On the other hand the NGOs have the advantage of autonomy and flexibility in their own structure and their partnership with a government institution or officer who is tied by the procedures may be like a pair of unequal bullocks resulting in strain and dissatisfaction to both.

Even in the seemingly faceless and impersonal government system, the success of cooperation may depend heavily on *personalities*. A single person with vision and openness for new things can make a world of difference. Whether NGOs find a cooperative government officer or an obstructive one in their path depends on their luck or on political manoeuvering. How to match compatible persons from two sides so that smooth working is possible is a major issue.

Government *money* should be available to NGOs in health if they too are working for HFA. And yet if NGOs take money from the government, they are either subordinated by political weapons or they are trapped and immobilised by the endless restrictions and procedures which necessarily accompany government grants. In both ways, the NGO looses its qualities or autonomy and speed.

How can government money be made available to NGOs and yet not have these side effects is an issue for discussion.

CHV Experiment: A Case of NGO-Government Interaction

When conceived, the CHV was to be a volunteer bringing with him/her the qualities of NGO, i.e. autonomy, motivation, community participation, etc. And yet during implementation he was converted into the lowest category of government worker with little financial remuneration. He was subordinated and internalised by the government health structure.

A fate similar to that of CHV must be avoided by giving attention to the various aspects of interaction discussed above. And yet, this is a new area of organisational research and innovation. Only through a process of trial and error, experimenting and learning that a feasible model will emerge. Respect for each other and openness is an essential prerequisite on either side.

Abbreviations

NGO : Non-government organisation
HFA : Health for All
FP : Family Planning
CHV : Community Health Volunteer

Edited by Sujata Gothoskar with the co-operation of Manish Mankad and secretarial assistance from Anuradha Naik and Eleuterio Fernandes. Produced by the Foundation for Research in Community Health, 84-A, R.G. Thadani Marg, Worli, Bombay 400 018. Telephone: 493 86 01. Printed by Modern Arts and Industries, A-Z Industrial Estate, Lower Parel, Bombay.

OXFORD

BOOK FORM REFILL

MENTAL HEALTH IN INDUSTRY

12½p

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15/11/73

MENTAL HEALTH

Dr. Alexis Brook

Methods of Diagnosis

1. Medical model - try to find out illness or disease afflicting individual based on signs and symptoms.
2. Psychodynamic model - try to understand patient - his conflicts, his problems

Medical Model

Adv - Quicker to Δ.
- Easy to write up.

Disadv - Patient not able to get the feeling of being understood as a patient

Psychodynamic

Adv - Patient gets feeling of being understood

Disadv - Difficult to Δ and write up
- Very time consuming.
- Doctor invites material which may affect him

Important - to look at every person from both angles

Example Two ♂ 30 yrs of age ∈ depression.

Mrs A - What is wrong with me?

Mrs B - I have an illness. Give me something to get better.

Applying models Mrs A - Psychotherapy
Mrs B - Antidepressants

Sometimes due to repeated visits - with doctor-patient relationship and expectations being at different wave lengths we get additional problem of.

- Antipathy
- Aggression
- Doctor begins ~~of~~ moralising (Symptom)
- Doctor avoids patient
- Matter of fact approach

- If patient wants medical treatment - then probing or too much understanding in the form of psycho. therapy will not be very useful.

Approach depends on individual patient.

1. Probing with p.t
2. Fishing. ē drugs

Effect of illness on Doctor or Nurses

1. 'Getting involved' - emotional involvement
2. Feeling of depression at sight of illness or disease

Built in defences:

1. Depersonalization — Case No 9
   Infected Liver.
2. For Nurses
   - rotation of duties
   - Each duty - single responsibility.
3. When juniors want their seniors to supervise and they get only appreciation but not help - can be frustrating.

Non-professional care-givers — Pub-keeper or Bartender (For men)
Hair dressers (women)

U S. Assoc
invite psychiatrists for annual conventions.
as well as run counselling courses

15/11

DEPRESSION

Commonest illness seen in G.P

History - Black bile - Galen
Demonology
Vapours from indigestion.] 16th - 18th century.
Toxins or poisons
Avicenna's whirling chair
1904 - Term 'depression' used by Adolph Myer.

Depressive states'
'Melancholia' - severe form.

Range: Normal .---.--/.....Pathalogical
Dividing line difficult to fix.

Normal depressive states
1. Faliure
2 Bereavement - grief.
3. Loss of possession

Pathalogical Depression

Medical Model - mild to moderate form.
1. Mood - changes
sad, sense of tedium, easily tearful, fed-up
low,
Important: irritability.
2. Swings of mood change within the day.
- Diurnal variation
3. Fluctuations over period of days
4. Change in persons capacity,
- feel tired easily,
- loose interest quickly,

- decrease in capacity

5. Insomnia - early morning waking
   tired feeling even after 8 hrs.

6. Appetite
   May increase - comforting oneself.

Presentation

1. Patient may present with 1-6
2. " may present with 'anxiety state' which may be masking a 'depressive state'
3. May present as odd 'somatic' symptoms (vague)
   e.g. wt on the chest → wt of the depression.
   menstrual disorders, diminished libido etc.
4. Hypochondriasis
   'strongly held belief that there is something seriously wrong with the body'
   - insistence on presence of disease and request examination and investigation.
5. Severe delusions - not so common

Psychodynamic Model - (help patient open up
do not ask specific questions)

① Family
- Role as husband or wife
- Role as father or mother
- Assessment of their life,

e.g Tell me about your marriage / and not / Are you living a happy married life?
What are your views on being a father / and not
Do you like being a father.?

② Occupation - Type - Capacity
- Satisfaction - Responsibility

- Peters Principle - Each man rises to his level of incompetence.
- How to assess one's fitness for present occupation or impending promotion.
- Is patient - fully stretched in work
  over or under stretched?

Ref: "Fraser's disease" - published by Tom in Journal of Soc. of Occup Med. (10 years ago)

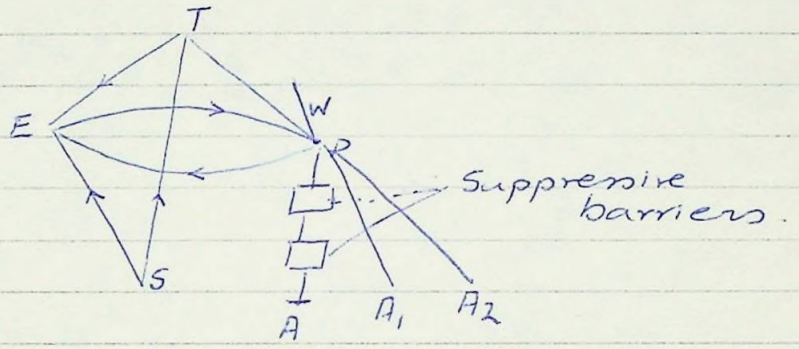
(3) Interpersonal relationships with friends
work-mates
other people generally.

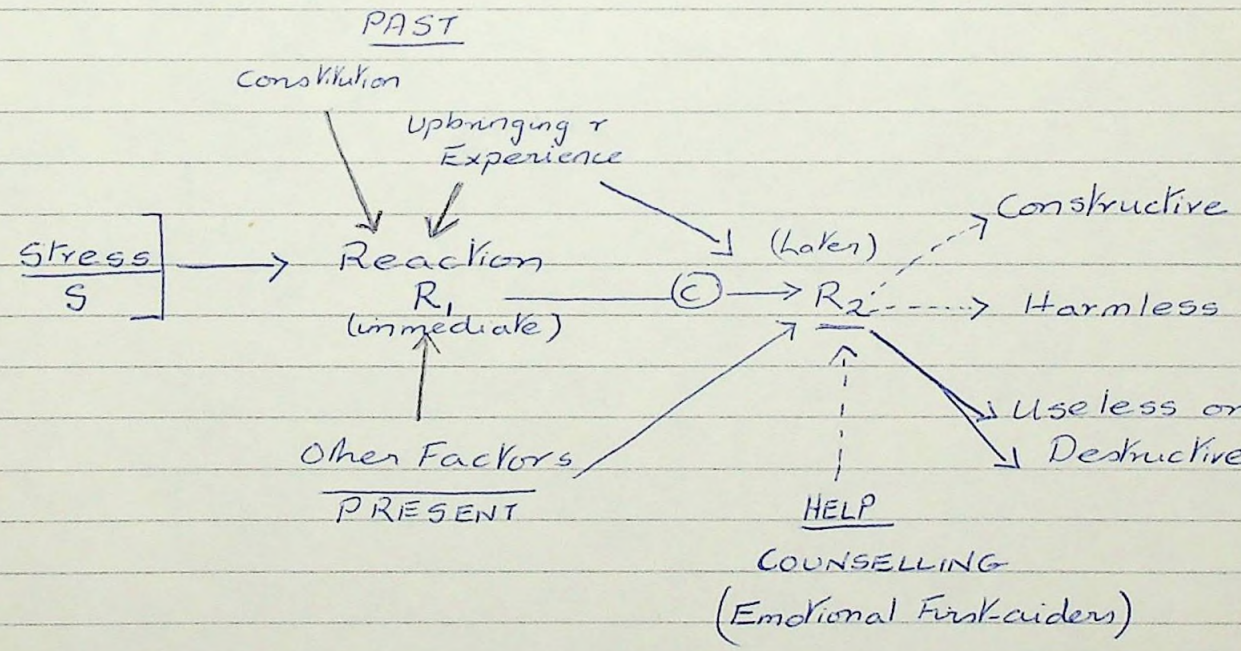
MENTAL HEALTH

19/11

INDIVIDUAL PROBLEMS IN HUMAN RELATIONS

Dr Tredgold





Ref.

Stress in Industry - J. L. Kearns
Prairie Press.

Emotional First Aid

Principles

1. Listening
   i) Person to ventilate views.
   ii) Guiding questions but not leading ones.
   iii) Get facts and situations down.

2. Help Patient to make his own decisions.
   - never accept the offer of running his life.

Treatment depends on Reaction to stress.

1. Constructive ⟶ Reinforcement by Friends
2. Harmless ⟶
3. Useless or Destructive ⟶ G.P ⟶ Psychiatrist
   IMO
   P.O ⋯⋯⟶ Undertaker

Important Factors in Environment.

Example: Why drivers swear more than pedestrians?

Drivers

1. Already under stress ⟵ concentration, previous frustrating situations, potential risk
2. Pride in Skill
3. Conspicuous
4. Safer to swear (two wind screen difference)
5. Little less control of vehicle - than over limbs.
6. Presence of other passengers
7. Driver doesn't have the physical outlet of walking away.

21/11 Dr Tredgold

COUNSELLING

Exceptions to the Principles of Listening without too much help or direction

1. Aggressive patients
2. Very emotional "

Aggressive patients need special handling

1. Never be counter aggressive

Other Techniques in Counselling

1. Reflection: Take up patients story and represent it to him with slight exaggeration
2. Amplification: Clarification of certain points of the story

Occupational disease - symptoms

Pt ☹ too little work — Irresponsible, Aggressive, Tries to get away

Pt ☹ too much responsibility — Anxious, Insecure, Find it Difficult to delegate, Concentration suffers

↓

Anxiety and Depression - because difficulty to be demoted.

Under paid - Self centred, Splinter groups, 'martyr spirit'

Hooliganism among Football viewers
1. Decreased satisfaction
2. Outlet for aggressive instinct

Compensation Neuroses

COMMUNICATION

Doctors have a good reputation as good communicators

Essential Requisites

Speaker
1. Method acceptable
2. Status of speaker
3. Acceptance as person
4. Avoidance of antagonism

Ideas
Constructive presentation
participation

? Value

Listener
Suggestable state
Listeners acceptability of idea
Counter suggestive listener
(Time of day)
Expectations
Previous knowledge round Subj.

Reference Mental Health in Industry.

1. Social Psychology in Industry J.A.C. Brown (Pelican)
2. Human Problems of an Industrial Civilization] Elton Mayo
   Social "
   Political "
3. Kornhauser, Mental Health - Criteria - Assessment
4. Ed Mclane - Mental Health and Work Organisation
   Too work is to human.
5 Quarterly - O Mental Health - Centre for O.M.H
   21 Bloomingdale Rd
   White plains
   New York 10605
6. E. Jacques -
   "The Changing Culture of a Factory"
   Span of Responsibility
11. O.M.H (Symposium)
   Ed Collins R
   Little, Brown Co
7. Lorenz, Conrad King Solomon's Ring
   Man meets Dog.
   On Aggression.
7. Antony Storr - Human aggression.
8. Robert Ardrey - African Genesis
   Territorial imperative
   Social Contract
9. Lionel Tiger] Men in groups.
   Robin Fox] Imperial Animal.
10. Stress in Industry J.L. Kearns

22/11 — Promotion + Stress — Dr. Alexis Brook

Promotion: Factors to be taken into consideration.

1. Personality role of job should match personality of person.
2. How much responsibility does job entail - and how much can the person handle?
3. Responsibility — required component
   — discretionary " → psychological greater strain

↓

Anxiety produced lasts till discretionary responsibility is proved right

↓

How long it lasts - depends on job - More senior the management position the greater the time span of anxiety

Greatest anxiety - is anxiety of uncertainty

Important to discuss all aspects of work with person prior to promotion

—

Mildly obsessional - conscientious, reliable, methodical
- over-values job
- his work is his way of life

↓

Breaks down when new change introduced in work → Important to recognise vulnerable personalities early

↓

Discuss with them - help to ventilate fear and anxiety

↓

Support them thru moments of conflict

—

Air traffic controllers — High incidence of H.T, DU + Diabetes

Stages in Stress

I Faulty inter-action between persons and organizat.
II People start to feel uneasy — often with minor complaints (multiple)
III - Overt illness - Doctors problem.

Imp not to use H/o of depression or R/ by psychiatrist against a person - esp for job etc

"Worrying in advance" - Janis —

3 Groups of worried

Denial group — Reality oriented — Neurotic worried.

"Career suicide"

—

22/11/73

Rehabilitation of Treated Psychiatric patients in Industry

Dr. Alexis Brook

3 Important Factors
1. Medication
2. Family Life.
3. Work.

(1) Medication
- Must take drugs regularly.
- can be supervised by O.H. Nurse.
- Long or short acting?

(2) Family Life
- Patient must preferably stay with family unless the family is itself a "hot house of emotions" – in that case they would be better of in a small lodging (not a large impersonal hotel)
- Family support and contact useful but open-question depending on individual case and his particular situation.

(3) Work
- Therapeutic value of work.
- steady impersonal stimuli rather than → incentive oriented situation.
- keeping vacancy open in old job as long as practically possible.
- Cooperation of supervisor and other colleagues – their education should be done by nurse or doctor (prep'n)
  - their feeling shd be taken into consideration

- Good communication between works, medical officer and mental hospital

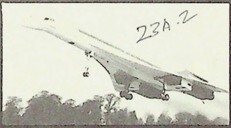
-

Preparation of groups of colleagues
— by discussion and verbalisation of anxieties re: return of patient.

ICI Paints Division

Slough Works

The site of ICI Paints Division's Slough Works, has developed into one of the largest paint producing factories in Europe from a few of the original buildings which housed the paint and varnish making of Naylor Brothers over 50 years ago. Today the site is a giant 30 acre industrial complex incorporating some of the latest plant and techniques for modern paint technology. The rapid growth sprang mainly from the success of the Dulux range of decorative paints. Added to this ICI is the leading paint supplier to the motor and aircraft industries. ICI paints are used on fridges, furniture, earth moving machines, ships, radios and television sets to name but a few.



Below: The home of ICI Paints Division. The Y-shaped Headquarters building is on the left of the Wexham Road opposite the modern five-storey Research block.

Introduction

Slough Works situated in the Thames Valley services the entire U.K. with the decorative paints and industrial finishes produced at Slough, from its 1,000,000 gallon capacity warehouse. Paints Division also has its H.Q. and Research and Development centre at Slough. The operation starting with patient research and development, manufacture, marketing and distribution is centred at Slough and backed by the other paint producing factories at Stowmarket and Glasgow, the Hyde Works where plastic sheeting and pvc coated fabrics are made and the wallpaper manufacture based at Oldham, plus the depots and sales offices situated to keep pace with the constant demand for ICI Paints Division products.

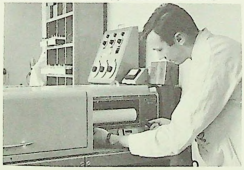
The entire Dulux Gloss finish and Emulsion ranges are manufactured at Slough Works. Added to this are the many industrial finishes for a variety of markets and topcoats for the car industry—paint in capacity from ½ pint tins to a customer's 34,000 gallon tank filled continuously with ICI Electrocoat primer. The 1,000 employees including skilled plant operators, technicians and scientists keep production over 10,000,000 gallons a year of finished products. Other products including Dufix adhesives and industrial varnishes are made in the Resins section of the Works which also make the main constituent for all paints.

Paints Division stay ahead in the highly competitive paint market to a great extent because of the work of the 500 personnel in Research and Development Department. Winners of the Queen's Award to Industry in 1969 for research into polymer dispersion, the department is concerned with the invention of new paints and coatings, the improvement of manufacturing processes and background research into the properties of surface coatings.

Across the Wexham Road from the Works and Research Department, is the stylish Division H.Q. building, housing the administrative force which ensures the efficiency of the Paints Division operation. The key to this success is the new computer centre which deals with the range of services from accounts to paint formulae.

ICI Paints Division is a worldwide organisation with associate or wholly owned factories in Australia, Argentina, Canada, S. Africa, India, Pakistan, Malaya, Portugal, Germany, Trinidad and many more countries. A liaison is kept with these operations through the Overseas Department at Slough.

Above: The 34,000 gallon Electrocoat Primer tank, at the Castle Bromwich Works of Pressed Steel Fisher. The waterbased paint is topped up regularly with tanker loads delivered from Slough Works.
Below: The 'Hardy' spectrophotometer and tristimulus computer enables an operator to make a permanent record of the colour of a paint in numerical terms. By using this apparatus, the operator can record colour differences which can only just be detected visually.

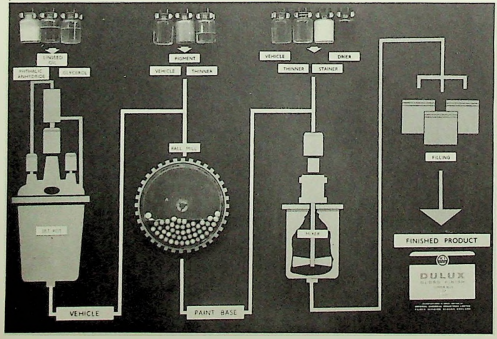


From Slough the U.K. and overseas markets are serviced with ICI paints whether the order is for single tins or tanker loads. The reputation of the paint of being a top quality product 'backed by the technical resources of ICI' is further ensured by the Technical Service and Colour Advisory Departments which offer a service to all customers which helps them to make the best use of the wide range of ICI Paints Division's products.

Flow Sheet

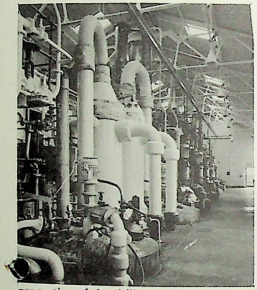
The popular misconception of paint making is that the technique is just a simple 'stick and bucket' process. In recent years the paint industry has seen a revolution in paint manufacture with the introduction of synthetic resins, complex formulations and new machinery. Even so, the basic constituents of paint have not changed.

Paint is made from three components —the pigment, which gives colour and opacity, the resin or binder which forms the film and the thinner or solvent which makes it possible to apply by brush, dip, spray or other method. The important steps in production are first to make the binder—nowadays almost wholly synthetic resin or polymer and secondly to incorporate the pigment into it using one of a number of different machines.

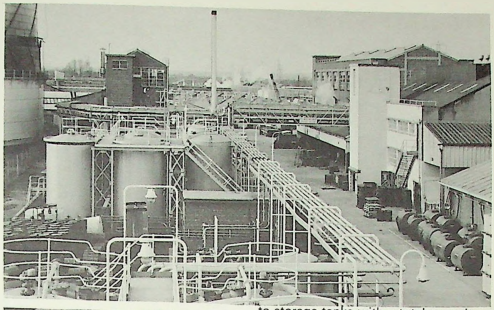


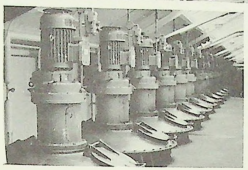
Manufacture

It is from the Stores department at Slough that the whole process of the manufacture of paint begins.
Raw materials arrive here and vary from a 24 ton load of pigment to a 5,000 gallon tanker of solvent. Raw materials, are very diverse; with over 950 items from all over the world, including the colouring and dyeing pigments, some of which are very costly items—(Monolite Fast Red costs £5.10.0 a lb.). To the decorator the Dulux tin is a well known sight, and 50 million of these tins are handled by the store each year. The solvent tank farms connected to the paints and resins departments by a network of overhead pipes are topped up by a fleet of tankers to the tune of 150,000 gallons a week.
This covers the basic constitutents of paint except resin which is primarily manufactured on site in the Resins Plant.
The manufacture of synthetic resins has greatly improved the



properties of durability, flow and gloss retention in paint. The last ten years has seen the introduction of several new types, acrylics for cars and industrial paints, P.V.A. latex for emulsion paints and the new Electrocoats for electro deposition on metal surfaces. The more traditional resins, alkyds for air drying and stoving finishes and urea and melamine resins are also made on the plant.
The different types of resins are made in separate buildings situated at the far end of the site.
These products are made in reactors commonly called kettles. Reaction temperatures of up to 250 degrees centigrade or higher are necessary and the process lasts 12 hours or more. After the chemical process, which calls for a high degree of skill from the plant operators, is completed, the resin solutions are thinned, filter-pressed and pumped





Top: In the foreground one of the Solvent Farms, with its network of overhead pipes feeding to the Paint department. In the middle, is the oil farm which services the Resins Plant.

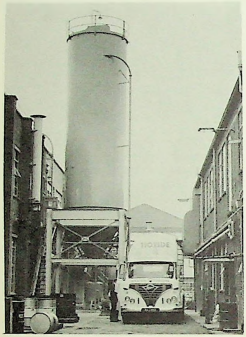
Above: A row of 600 mixers, which are used in the second stage of preparing a batch of paint. The vehicle, thinner and drier is added to the concentrated paint base ready for the final colour matching.

Left: The Alkyd Resins plant with its row of 'kettles', which produce a wide range of resins used in products manufactured by Paints Division.

Below: Speed and accuracy are essential in filling 'Dulux' into millions of cans of different sizes. Paints Division engineers have designed ingenious machines to do the job.

to storage tanks with a total capacity of 350,000 gallons. Most of the resin is supplied by pipeline to the paint department for pigmentation, but some is blended to produce clear industrial insulating varnishes, beer can lacquers and adhesives.
The Paint department is the hub of the Works where the different ingredients, the pigments from the dry colour stores and the resins meet to be dispersed into a base. The pigments are dispersed in the resins by a variety of machines; Ball mills, large steel drums half full of steel or porcelain balls, which cascade as the drum revolves are used to disperse the highly concentrated pigment base for car and industrial finishes. Fifty Ball mills with capacity of 50 to 1,000 gallons are housed in the Paint department. Attritors and sand-mills use different techniques to disperse the same materials, the latter being used where high quality Titanium pigments are used as in Dulux White gloss paint. High speed mixers have been developed in the industry whereby all operations are carried out on one

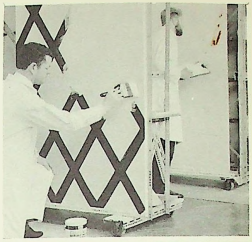
Manufacture

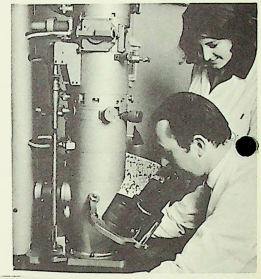


machine. The contents are both mixed and ground by a blade shaped like a circular saw two feet in diameter, which transmits very high dispersion power to the batch. Emulsion paint is made by a similar process except that the combination of oil and resin is replaced by a water based emulsion. The final stage, is carried out in the mixing section, where the base of the batch of paint is transferred from the ball mill, attritor etc. to a separate finishing mixer, where carefully weighed ingredients such as solvents, dryers, anti-skinning agents, etc, are added. It is at this stage that the true colour of the paint is reached. Tinters are added until the skilled colour matcher has corresponded the batch with the correct colour standard. The various properties of paint batch are then tested and passed by the Control Laboratory. The very large number of products being manufactured at one time necessitates that an accurate control record is kept, not only of items being manufactured, but also of the stage which each has reached. Decorative paint is strained into portable containers and transferred to another building to be filled into tins. The paint is fed into the machines by means of automatic air controlled valves. Tins ranging in size from ½ pint to 1 gallon are fed into the machine, filled, capped and passed along a conveyor belt for packing. Half pint and 1 pint tins are packed into cartons for easy handling. These in turn are stacked on pallets of uniform size into the warehouse.

The warehouse, a four-storey building, capable of holding over a million gallons of paint, acts as a store for finished products from Slough and some products from other factories in the Division, and as a distribution centre to Paints Division Depots and customers on demand.

The paint is brought by fork lift trucks and stored in bins or pallet racks. Loading goes on day and night onto long distance lorries and local delivery vans. A proportion is also for export. The entire works is in full production day and night, operating a three-shift system. The smooth running operating includes canteen facilities on site, a medical centre, an efficient fire brigade which is run by men on the works. Training is given to all the plant operators on joining the Company. Much of the paint making history of the last half-century has been written here at Slough. The team work, the technological skills and the enthusiasm of all Paints Division's personnel will ensure that much of the future progress in paint making will also take place here at Slough.





Top right: Comparative hiding tests being carried out in the Development department at Slough between Dulux and other paints.

Above left: The latest development in the bulk handling of pigments. The Titanium Dioxide silo holds pigment used in the manufacture of Dulux Gloss paint and Supercover Emulsion. The pigment is pumped by compressed air from the 90 ton silo direct to the high-speed mixers.

Centre right: Many hundreds of investigations are made each year with the Electron Microscope, which can magnify up to 50,000 times. It is used for examining the shape and structure of pigments and extenders, paint surface defects and for studying the internal structure of paint films.

Above: Paint supplies are sent daily from Slough Works Warehouse to Paints Division Depots strategically placed throughout the country.

1969

THE QUEEN'S AWARD TO INDUSTRY

ESSO AT FAWLEY

1969

Esso Petroleum Company, Limited is the U.K. affiliate of the group parent company – the Standard Oil Company (New Jersey). Founded in London in 1888, it is among the oldest and largest of the oil companies in the United Kingdom. Its net assets are over £300 million ; with its affiliates it supplies more than a quarter of the nation's oil products, and its annual turnover is over £600 million. It collects more than £300 million each year in Customs and Excise duties and the value of its total annual export amounts to £20 million.

CHEMICALS

1970

Esso Chemical Limited, founded in 1965, is the United Kingdom affiliate of the world-wide network of Esso Chemical Company i which operates 64 manufacturing plants in 29 countries.

This leaflet provides a brief description of some of the refining and chemical manufacturing processes of these Companies at their Fawley complex ; on the back page are listed some of the salient facts and figures about Fawley.

Esso Petroleum Company – major refining processes

1 Primary distillation
This is a process of fractional distillation. Crude oil is first heated in a furnace and the vapours produced are then condensed in a fractionating column to produce fractions of different boiling ranges These raw fractions are subsequently further refined or purified.

2 Catalytic cracking
Cracking breaks large oil molecules into smaller ones. One application at Fawley is in cracking a heavy gas oil to form high grade petrol and gas. The process used is known as 'fluid catalytic cracking' – 'fluid' because the catalyst (this helps the cracking reaction without being changed itself) can be made to flow like a liquid when it is blown with air or hydrocarbon vapour.

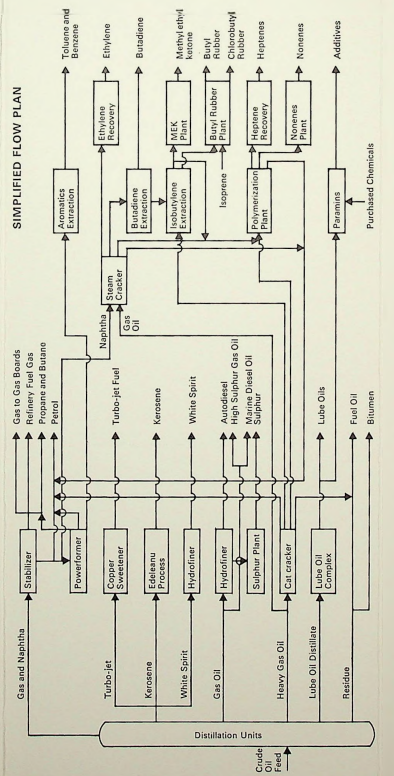
3 Powerforming
This process changes the configuration of atoms within molecules rather than the size of the molecule. The Powerformer converts low quality naphtha from primary distillation into a high-quality petrol component.

4 Polymerization
Polymerization is the reverse of cracking ; it builds up small molecules into larger ones. Light gases, produced by the catalytic cracker and chemical units, are combined to produce heavier materials, such as heptenes and high-quality petrol.

5 Treating processes
Almost all the fractions obtained by primary distillation need to be further 'treated' to meet the very stringent specifications demanded. One example is the removal of sulphur from such products as diesel oil and white spirit. This is done by a *Hydrofining* process, where sulphur compounds are converted to hydrogen sulphide. The H_2S is then fed to the *Sulphur Recovery* plant capable of producing up to 60 tons/day of pure rock sulphur. Further examples of treating are the *Edeleanu* process for the removal of aromatics from kerosene and the copper sweetening process for converting corrosive and malodorous compounds into non-corrosive and inoffensive ones.

6 Lubricating oil manufacture
Feedstocks for lubricating oil manufacture are prepared by vacuum distillation of the residue from primary distillation of certain crude oils. There are three further processes :
i Phenol treating to remove undesirable aromatic compounds.
ii Hydrofining to improve the colour and stability of the oil.
iii Dewaxing to improve the 'pour' characteristics.

7 Bitumens
On this unit the residue from vacuum distillation of Venezuelan crude oil is blended with a diluent to produce a range of penetration grade bitumens, some of which are subsequently air blown to produce oxidized bitumens.



Esso Chemical Limited – major manufacturing plants

8 Steam cracking and ethylene recovery
Steam cracking is a high-temperature thermal cracking process to produce olefins and diolefins as feedstocks for other chemical, plastic and rubber manufacturing processes. The feedstock of either naphtha or gas oil is vaporized, mixed with steam, and heated to high temperatures. Under these conditions most of the high molecular weight hydrocarbons in the feed are cracked to produce a wide range of low molecular weight hydrocarbons including ethylene, propylene, butenes and butadiene. These are separated as saleable products or for further processing in other plants.

9 Isobutylene extraction and recovery
This extraction process, using sulphuric acid as a solvent, separates and recovers isobutylene from mixed butenes produced during the catalytic and steam cracking processes. Isobutylene is one of the feedstocks for the manufacture of butyl rubber.

10 Butadiene extraction
These units recover and purify butadiene from the raw butadiene-containing streams produced by the steam cracking units. Butadiene is fed to neighbouring International Synthetic Rubber Company for the manufacture of the synthetic rubber – styrene butadiene. End uses include car tyres.

11 Butyl rubber unit
This unit consists of a co-polymerization section where raw rubber is made from purified feed streams of isobutylene and isoprene, and a finishing section, where the raw rubber is dried, baled and packaged. The unit has been recently expanded with facilities to manufacture chlorobutyl rubber.

12 Aromatics extraction unit
Another extraction process, using a feedstock from the Powerformer, rich in aromatics. This feedstock is subjected to sulfolane extraction and subsequent fractionation to recover toluene and benzene. These important intermediate chemicals are used in making plastics, synthetic fibre, detergents, paints, dyes, etc.

13 Methyl ethyl ketone unit
Butenes from steam cracking are extracted with sulphuric acid to recover normal-butenes as secondary butyl alcohol. The crude alcohol is purified by fractionation and dehydrogenated, by a catalytic process, to methyl ethyl ketone (MEK) which is then purified by further fractionation. MEK is used as a solvent for industrial and pharmaceutical applications.

14 Paramins plant
A series of vessels in which various purchased and indigenous chemicals are reacted or blended, in batch processes, to give a wide range of additives, a number of which are used to improve specific characteristics of lubricating, fuel and crude oils.

The marine terminal

The terminal, over 5,000 feet long and with five deep water and four coastal berths, handles about 4,000 ships a year. It is manned by twelve operators per shift and with maximum discharge rates of 10,000 tons per hour, partly laden vessels of up to 300,000 deadweight tons (draught limitation 49 feet) turn-around within 24 hours. With over 18 million gallons of crude oil or refined products crossing the terminal each day, it handles more tonnage in one month than is handled by the Port of Southampton in a year.

Automation

Direct Digital Control (or D.D.C.) is the operational term which describes the system of computer control installed in two areas of the refinery. The first of these was commissioned in 1968 and won for Esso Petroleum Company the distinction of being the first oil company to receive the Queen's Award to Industry. In 1970 Esso Chemical Limited were similarly honoured for their contribution to the export market – the Company having increased its exports from 16 per cent. to 33 per cent. on total sales over a three-year period.

Environmental control

Industrial development must always be at a certain cost in terms of loss of amenities. Our aim at Fawley is to keep this cost down to the minimum and have so far spent £3 million on eliminating or minimizing nuisance that we might otherwise cause.

Noise control alone has cost about £500,000 and chimney stacks have been constructed up to 450 feet above ground level to facilitate rapid dispersion of flue gases. Extensive and stringent precautions are taken to minimize the possibility of accidental pollution of Southampton Water. Over 28,000 trees and shrubs have been planted in a 2-miles-long belt to screen the refinery on the landward side. More recently plans have been published on the proposed landscaping of the refinery's foreshore.

Standard Oil Company (New Jersey)

The parent company of the world-wide Esso group, owns in whole or in part more than 300 affiliated companies employing about 150,000 people.

At the beginning of 1972 Esso had interests in exploration and production in 31 countries, refining in 37 countries and marketing in more than 100.

During 1971 Esso affiliates completed a total of 834 wild-cat and development wells, both off-shore and on-shore, in 20 countries.

Esso accounts for more than 15 per cent. of the free world's total crude oil and natural gas production, 14 per cent. of its refining activity and 14 per cent. of its petroleum product sales.

Some facts and figures about Fawley

General

Small refinery commissioned in	1921
First major expansion	1949–1951
Capacity of the refinery per year	19 million tons (13 mill/gall/day)
Employees	about 2,200
Investment at Fawley	£140 million
Investment per employee	£63,000
Land area (includes undeveloped foreshore)	3,300 acres (about 1,300 acres developed)
Local rates per year	over £1¼ million
Local harbour dues, pilotage and tugs per year	about £½ million
Local wages, salaries, purchases per year	£9 million

Utilities Required

Steam per hour	1½ million lb.
Electricity per day	2½ million units (more than Southampton uses daily)
Electricity, peak load	107 megawatts
Water (fresh) per day	13 million gallons (cost £½ million)
Furnace fuel (oil and gas) per day	850,000 gallons

Storage

Number of tanks and spheres	nearly 500
Largest tanks (two of largest in world), capacity of each	over 21 million gallons

Crude oil sources (1971)

Middle East	73 per cent.
Libya	22 per cent.
Venezuela	5 per cent.

Product distribution (1971)

By sea	52 per cent.
By pipeline	36 per cent.
By rail	9 per cent.
By road	3 per cent.

23-4

OCCUPATIONAL HEALTH SURVEY

In the final analysis

It is the Man that produces

and NOT the machines

Hence it is richly rewarding to invest in preventive Maintenance of Human Component of Industry.

Your employee, be he a Shop Floor Hand, Supervisor or an Executive, whatever be the motivation and rewards, cannot contribute to your management by objective, if he is not maintained in optimal health.

What is not always obvious is the employee in Sub-optimal health is giving less than what he should, production. To his gainful work, physiological and psychological demands of work and work environments may be significant contributory constraints.

Your organisation has an individuality of its own, diligently developed for the climate of your enterprise. As a corollary, your human needs are also special. Standard stereotyped procedures may not be the best choice for you.

The consultancy initially would consis of being in your plant for minimum required number of days, observing the working of your men at work, work, work environment with your Doctor, Safety Officer, Industrial Engineer, personnel officer on the lines indicated earlier, pre-parting an initial report, discussing it individually with your officers, followed by group discussion with your executives. The report is then finalised on this basis and presented to you for the phased implementation The comprehensive offer is to:

1. Critically observe existing arrangements for curative Medical care and preventive Health care in your organisation to spot possible areas of better and effective utilisation.

2. Observe "Man-Machine systems" on the shop floor to assay total long term effects on human component of industry, particularly preventable ill-health, strain and stresses, due to unscientific matching of man to machines.

3. Study sickness absenteeism pattern investigate if this is an occupational contribution to this and suggest remedical measures.

4. Study employment injuries and resultant lost time and suggest methodology to scientifically investigate the objective reduction of morbidity and financial waste.

....2

5. Conduct a Safety Survey, with particular emphasis on human causes for Employment injuries.

6. Medically interpret and utilise all previous survey of Environment in planning men protection at places of employment in the context of environment.

7. Plan for minimal additional work enviornment surveys as indicated, such as Gaseous, Vapours, fumes, dusts particles, heat, noise, vibration, lighting humidity that could be the basis of work rationalisation and scientifically assist better and safe working.

Monitoring seeks to determine our total exposure to pollutants. Accurate and reliable monitoring data are essential in every step of pollution control (a) to establish baselines from which changes can be measured (b) to identify pollution problems, (c) to provide data for defining standards (d) to evaluate pollution abatement results, (e) to provide evidence for enforcement action, and (f) to provide early warning of unforeseen problems".

Occupational health monitoring programmes would have to be chosen and installed after clear and careful defining of the sought objectives, since the difficulty of defining in detail exactly what information is needed can be surprisingly agonizing, at times. The inclusion of specific physical, chemical and/or biological measurements and the specificity of responses expected therefrom should be given due importance.

8. To study the points raised by Factory Inspectorate that have a Health basis and economically arrange to implement them avoiding infructuous expenditure.

9. List out possible hazardous occupations - statutory and others and plan medical monitoring and remedical action.

10. Medical aspects of environment pollution - Many difficult Governmental rules and regulations are in offing.

11. Fatigue is the basic cause of work imperfections and interruptions. Medical Sciences identify the multiple causes of physical and mental fatigue and assist industrial Engineer and Personnel Managers in making acceptable decisions.

Initiate Medical and Industrial Engineering Personnel in simple shop floor procedures to evaluate the physiological cost of work which could keep of work study and job evaluation and wage structuring.

12. On the basis of all this, to suggest on integrated working scheme for the medical and Safety services in areas common objectives.

Your Medical services are doing good work. But I am sure you will agree this can be bettered by Occupational Health Orientation and result oriented reorganisation on the basis of modern concepts of medical contribution to total professional management.

All this has the objective of fully utilising the existing services to provide for preventive maintenance of human component of industry to ensure the work and productivity of the employee does improve.

The additional funding, if any, would be very minimal, but benefit accrued would be substantial.

You have all the elements that are required. What I offer is expert neutral observer study, study of data and findings delinking, linking, reallignement and orientation with the final objective that the employee benefits by all interest and financial involvement your organisation has in the postive health of employees.

The total objective of the Occupational Survey is to offer medical and para medical services for utilisation in man power conservation. This is not a sophistication of developed countries, but is very relevant to developing countries like ours, where well trained man at machine is a precious asset of the organisation. Abroad many agencies look after him, but out here, your man conseravation is one of your productive investments.

23A-5

EPIDEMIOLOGY OF ACCIDENTS

Plan of Lecture - Introduction

1. Definition of 'Accidents'
2. Classification of Accidents

   by site/situation/nature of external agent

   nature of injury/severity

3. Magnitude of the problem
4. The Epidemiological triad

   Interaction of Agent, Host and Environmental factors
5. Human vs Environmental Factors
6. Epidemiological factors in

   a) Traffic Accidents

   b) Domestic Accidents

   c) Industrial Accidents
7. Consequences and cost of Accidents
8. Accident Prevention

   a) Primary(For each type)

   b) Secondary - First Aid and emergency services

   c) Tertiary - Rehabilitation
9. Role of Health/Safety Education
10. Role of legislation for standards
11. Accident Prevention Programme - Coordination of different organisations
12. Areas of Research/References

INTRODUCTION

Some ideas/facts

In the time taken to read the special issue of World Health on Road accidents - Oct 1975 450 men,women and children would have been killed or injured on the world's roads.

'Epidemic on wheels' - 'Autosclerosis'

The energy crisis had a brighter side in Europe; Petrol prices and heavy fines for exceeding new speed limits helped to cut accidents by one-third.

Our attitude to accidents today is like that of our forefathers to smallpox and cholera. We still think they are inevitable(side effect of modern living)unpredictable. We now know that we are wrong.

Urbanisation, Industrialization and Growth of scientific technology is making our home, work site and general environment including our roads more complex and in the absence of adequate action and education - more possibilities of accidents in the future.

(1) Definitions

a)'An unpremediated event resulting in a recognisable injury'(WHO 1957)

b) 'An occurence in a sequence of events which usually produces unintended injury, death or property damage (American National Safety Council)

(2) Classification of Accidents

a) By site/situation

i) Transport Accident - Road Traffic
- Aircraft
- Watercraft
- Railway

ii) Domestic/Home Accident

iii) Occupational Accident - industrial
- agricultural
- others

b) By nature of external agent

i) Physical - Heat/Radiation/Noise etc

ii) Chemical - Poisons/corrosives etc

iii) Mechanical - heavy objects vehicles machinery etc

iv) Biological - animals

c) By nature of injury

i) Physical injury - cuts/bruises/fractures
ii) Burns/scalds
iii) Asphyxi
iv) Drowning
v) Injury to special senses
vi) Poisoning

d) Severity

Minor/Moderate/Severe
Fatal/Non Fatal

District Hospital Profile (10)

Accident cases
Motor vehicles - 19%
Burns - 18%
Falls - 15.6%
Poisoning - 11.7%
Machinery - 8.4%
Fall of heavy object - 6.4%
Trains - 4.5%
Cycles - 4%
Drowning - 0.77%

(3) Magnitude of problems

Accidents in general

- Fourth leading cause of death at all ages
- Number one killer in 15-45 age group
- Epidemic in developed world. In the west roles of infectious diseases and accidents as causes of death have been reversed, 1946-infectious diseases double of accidents 1951 - infectious diseases = accidents 1956 - Accidents double of infectious diseases

Road Traffic Accidents

World - 7 million injured and 0.25 million killed every year (17)
(west)
- 1 person killed every year per 1000 vehicles(8)
- 10% of hospital beds in some countries occupied by RTAS(17)

- For every person killed in a RTA, 10-15 are seriously injured and 30-40 receive minor injuries(17)

India -

- 2 million motor vehicles on Indian roads in 1975 and its cities suffer a road death toll 10-15 times greater than in UK or USA (WHO 1975)
- Fatal accidents in Delhi is 1-2/day
- 8 persons killed every year per 1000 vehicles(8)
- Increase in population is 2.5% and increase in motor vehicles is 15% per year. Increase in RTA is 15-20% per year

Home Accidents

West - Developed countries have 1 day disability per year for 5-10% of the population

- USA - it is 1/3rd of non-fatal and 1/4th of fatal injuries
- UK - 35% of fatal injuries
- For every fatal domestic accident there are 150 significant non-fatal and 3500 non significant, non fatal accidents

India - non reliable statistics

- Estimated to be nearly half of all accidental deaths

Industrial Accidents

World -

India - 3 million man days are lost annually in India due to industrial accidents

- Rates vary for different occupations
  - Mines - 50/1000 workers
  - Docks/Ports - 45/1000 workers
  - Railways 45/1000 workers
  - Factories 18/1000 workers

(4) The Epidemiological Triad

Agent ——————————Host

Environment

For every type of accident we can determine factors that form part of the epidemiological or ecological triad

a) Road Traffic accident

Agent = vehicle

Host = Road user - pedestriant
- passenger
- driver

Environment = Road and climatic and other environmental conditions

b) Domestic accident

Agent = Physical/chemical/Mechanical/Biological agents in home

Host = Resident of home

Environment = Home environment

c) Occupational accident

Agent = Machine/Process/Materials

Host = Worker

Environment = Work environment

(5) Causative Factors in Accidents may be broadly divided into two major catagories

a) Human - 80-85% of accidents occur due to these factors

i) Physical - defects/disabilities

ii) Physiological - Age/Sex-Fatigue

iii) Psychological - intelligence/accident proneness
reaction time .°.alcohol/drugs

iv) Emotional - Anger/Fear/Worry/carelessness

b) Environmental - These may be due to

i) Physical factors - heat, light, noise

ii) Chemical factors - poisonous, corrosives

iii) Mechanical - fall of heavy object, impact etc

e.g. - inadequate lighting
- slippery floors
- unguarded machinery
- defective vehicles

(6) Epidemiological Factors in

A = Road Traffic Accidents

a) Road Type 65.2% on straight roads 29.2% on intersection(7)
Design
Curative
Lighting = 20% of accidents(6)
Skid resistance
Traffic signals
Separation of user types
Usage and adequacy for traffic flow

b) General Environment

Climate - rains etc
Visibility
Time of day Maximum 9-10 A.M. 4-5 P.M.(7)
Day - night

c) Vehicle

Maintenance of efficiency
Lights
Brakes
Steering
Tyres
Exhaust Assembly
Other parts
Ventilation
Interior design
Visual obstruction to driver

d) Road user(all categories) 96% of cases (17)

Age 37% in 20-30 age group (7) (17)

Sex Males 5 times more than females(7)

Physical defects

Mental defects

Education 47% illiterate (7)

Training

Experience

'Way of Life' concept

Fatigue

Visual efficiency
Defective hearing } 4.8% had defect(7)

Reaction time

Drugs/Alcohol 1% intoxicated drivers(7)

Accident proseness

Anticipation/Avoidance
(defensive driving)

Catagory of user - Pedestrians 41.1% of RTA(7)

B-Domestic Accidents (1)

a) Commonest types

Burns

Shocks

Accidental ingestion/poisoning

Falls

Cuts/injuries

Suffocation

Drowning

Limb/hair in moving equipment

b) Environmental Factors

Poverty

Overcrowding

Poor housekeeping

Ill designed equipment

Lack of storage space

Open fires

Broken floors/stairs/walls

Absence of play space

bad electric connections
Easily accessible drugs/insecticides - fuel agents

c) Human Factors

Age
Sex

Physical

Poor health
Poor vision
Poor hearing
Physical disability

Psychological

Low intelligence
Fatigue
Accident proneness
Drugs/Alcohol

Emotional

Anger
Fear
Worry
Stress
Carelessness

Children (Park 20)

Crawling inquisitiveness
Experimentation/bravado

Old people (Park 20)

Impairment of vision/hearing
Diminution of reflexes
Weakening of muscles

d) Social Factors

Ignorance
Children/aged people left at home with inexperienced help or no help at all

C - Occupational Accidents - especially Industrial

a) Environment

Poor house keeping
Temperature
Poor illumination
Humidity
Noise
Unsafe machines
Hazardous processes/materials

b) Human factors

same as in domestic accidents but also include other factors such as

experience
working hours
time of day or shift
inattentiveness
overconfidence
monotony
lack of training

c) Social

shop floor supervision
labour management relationship
social stress in industry

(7) Consequences and cost of Accidents

Death	Pain
Morbidity	Suffering
Disability - temporary	
- permanent - partial	
- complete	
Traumatic neurosis - fear, anxiety	
loss of education	
loss of productivity/job	
sickness absenteeism	
social consequences - unemployment, destitution etc.	

Cost of Accidents is very difficult to determine because costing of many of the consequences is difficult in practical terms

However costs would include

medical and surgical treatment
cost of disability/death
loss of wages — reduced tax revenues
damage to property
legal compensation(to accident victims/family) and so on
administrative efforts - police & judicial investigation

Sweden 1970 - Population - 8 million — 440 million sw.kroneses
loss due to accidents - 110 million dollars

(8) Accident Prevention (17)

Accidents do not occur. Accidents are caused. In almost all kinds of accidents over 90% are due to some error of a humabbeing. Thus if the human factor can be controlled over 90% of the accidents can be prevented. A = Primary prevention which includes health promotion and specific protection are therefore the most important components of accident prevention programmes.

a) Road Traffic Accidents

Better design and maintenance of roads. Better design and maintenance of vehicles legislation regarding standards. Highway codes.

Road users - Education in road safety
- Training for use/driving
- Licensing/Driving tests

Pre-license medical inspection/screening for medical conditions
Screening for defective eyesight - colour blindness visual acuty etc.
Screening for alcohol/drugs -Breathalyser
Specific protection - safety belts/crash helmets

b) Domestic Accidents

Education of parents
Elimination of factors(Built in protection)
Regular repair and maintenance
Adequate and safe storage provisions
Regulation and enforcement of standards for housing/equipment/packing/ labeling and warning regarding hazards
Social welfare measures
Home help/child care/counselling

c) Industrial accidents

Adequate preplacement examination
Adequate job training
Continuing education
Adequate publicity/safety signals/posters
Establishing safety department under safety engines
Ensuring safe working environment with built in protection
Specific personal protection
Periodic survey to find out hazards
Careful reporting and maintenance of records

Thorough accident analysis system

B- Secondary Prevention i.e. early diagnosis and treatment

a) Screening for medical conditions/defective senses/screening for alcohol and drugs/psychological screening are all measures to detect those who are accident prone or at risk of being involved in accidents. Identification of such individuals could come under early diagnosis.

b) First Aid at site of accident can be life saving

- Training of first aiders in an important task in prevention of the ill effects of accidents
- Provision and regular maintenance of first aid kits
- Refresher courses for first aiders (St Johns Ambulance and Red Cross)

c) Provision of Ambulance/other transport facilities - to be used to take accident victim to hospital or other expert medical attention

d) Casualty/Emergency department of Hospital

well planned,
well equipped
well staffed
standardised regimes
24 hours availability of service
prompt medical/surgical treatment

C-Tertiary Prevention

Measures to limit disability and rehabilitation of accident victim physically, mentally, socially and occupational

(9) Role of Health/Safety Education

Safety is basically a matter of individual adjustment. Adaptation to the hazards of the immediate environment is essential. For ones physical well being as well as for survival and this involves ability to anticipate and recognise hazards. It is therefore necessary to develop the attributes essential to safe living:-

i) Safety knowledge
ii) Safety attitudes
iii) Safety practices

Health and Safety KAP should be inculcated in all parents, workers and road users - in effect the whole community. For this every type of media and every agency should be involved. Ideally this should become part of the general educational system.
(Demonstration of safety posters/pamphlets/flip charts)

(10) Role of Legislation - Accident prevention needs the enforcement of various standards/regulations/codes and the legislation for punitive measures against those who do not follow these rules.
These include
Environmental legislation - safe roads
Safety factors in environmental design
Housing standards
Built in protection in factories - statutory regulation
Threshold limit values
Packing standards
Labelling standards for drugs/chemicals/insecticides/fuels
Statutory safety warnings etc.

(11) Accident prevention programme organisation

A good accident prevention programme for a country/state/city will require close and effective coordination in education and regulation of the community by the following agencies:

Health Department	Industries
Labour Department	Schools
Works & Housing Department	Welfare agencies
Police Department	Trade unions
Education Department	Voluntary agencies
Law Department	Research institution

Accident
Prevention
Programme

(12) Areas of Research

i) Gathering of precise information about extent
type
characteristics
of different type of accidents at national/regional/district/city levels

ii) Correlating accident experience with personal attributes and environments in which accidents occur to determine predictable factors

iii) Investigating newer and better methods of altering human behaviour

iv) Environmental and safety engineering

v) Better methods of personal protection

vi) Evaluation of control measures

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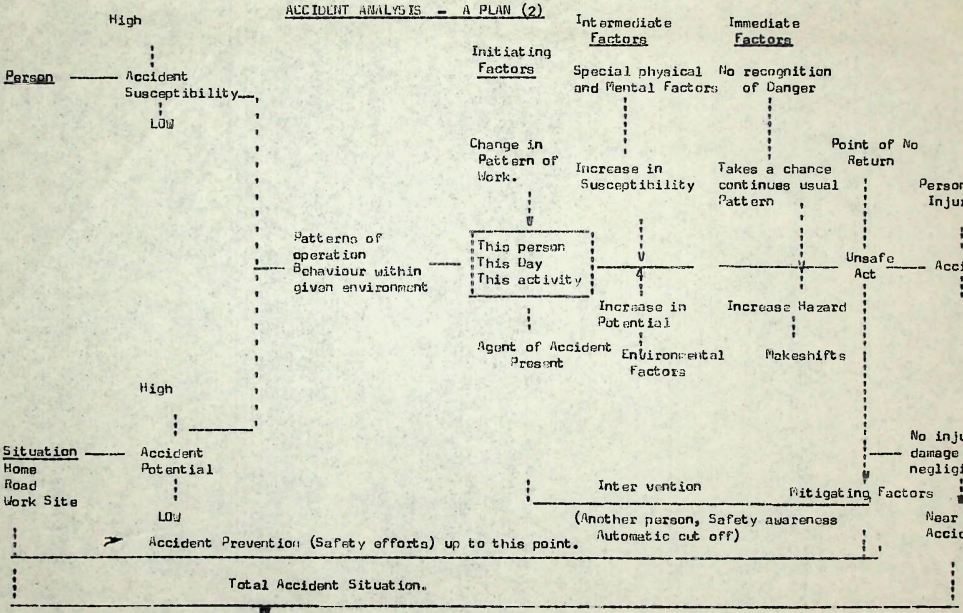
ACCIDENT ANALYSIS - A PLAN (2)
High
Person
Accident Susceptibility
LOW
Initiating Factors
Intermediate Factors
Immediate Factors
Special physical and Mental Factors
No recognition of Danger
Change in Pattern of Work.
Increase in Susceptibility
Takes a chance continues usual Pattern
Point of No Return
Personal Injury.
Patterns of operation
Behaviour within given environment
This person
This Day
This activity
Unsafe Act
Accident
Increase in Potential
Increase Hazard
Agent of Accident Present
Environmental Factors
Makeshifts
High
Situation
Home
Road
Work Site
Accident Potential
LOW
No injury or damage or negligible
Inter vention
Mitigating Factors
(Another person, Safety awareness Automatic cut off)
Near Accident
Accident Prevention (Safety efforts) up to this point.
Total Accident Situation.

23A-6

ERGONOMICS

ERGONOMICS:- Technology of Work Design.

ANATOMY:
- Anthropometry - body dimensions
- Biomechanics - force application

PHYSIOLOGY:
- Work Physiology - Energy Expenditure
- Environmental physical - effect of physical environment

PSYCHOLOGY:
- Skill Psychology - information processing
- decision making
- Occupational Psychology - Training
- Effort
- Individual differences.

1. The effective practice of ergonomics involves the application of principles of human anatomical, physiological and psychological functions to work. It I comprehends:

(1) the total physical environment of the worker (heat, cold, humidity, air speed, noise, lighting and decor);

(2) the design of workplace, tools, machinery, furniture and their layout;

(3) energy requirements of work;

(4) motor function requirements of the job;

(5) the demand required of special senses (visual discrimination, colour sense, hearing).

For convenience certain aspects of ergonomics are dealt with individually.

The visual requirements of work:

2. Visual acuity. This may be described as the finest degree of which the eye is capable of discriminating fine detail. It is influenced by type of detail, illumination, contrast and surrounding brightness. For convenience it is measured by the ability to read test charts of letters of graded sizes. Normal vision is that when separations of adjacent contours of the letters subtending an angle of one minute of arc at the eye can be made out.

3. Binocular vision and depth perception. The co-ordinated use of the two eyes and the critical fusion of the two images produce accurate stereo-scopic depth perception. With monocular vision a degree of depth perception is possible relating experience of relative sizes, change of shade with distance and motion parallax; this is inferior to binocular vision and fails when lighting conditions are poor.

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4. Colour vision. A variety of degrees of deficient colour vision exist and tests may be addressed to the dark adapted or daylight eye, transmitted or reflected light, sorting, naming or matching. The dividing line between acceptable and unacceptable varies according to the requirements of the job.

5. Aids to vision. These may be discussed under the following headings:

(1) Illumination. A good standard of illumination is the first aid to vision.

This implies an adequate lighting intensity at the job, adequate but not excessive contrast between the work piece and its immediate surround, the overall lighting of the workplace and well designed lighting fittings. Adequacy varies as the size of detail and the age of the worker. The finer the detail and the older the worker the greater the lighting intensity required. The ergonomic design of machinery provides for the absence of specular reflection from metal parts and layout of the workplace should avoid problems produced by natural lighting. The appropriate type of light source (tungsten, varying phosphors in fluorescent tubes) will determine ease of colour appreciation. Shadow may be detrimental to certain visual tasks yet essential for others.

(2) Spectacles. These may improve visual acuity to levels suitable for the work under consideration and even correct minor stereoscopic defects. Where there is a major problem in stereoscopy it may be possible by the use of appropriately placed prisms to overcome lesser degrees of convergence defect for the near point. An ophthalmic surgeon with experience and interest in occupational problems is an invaluable help. Orthoptic treatment is of limited use.

(3) Magnifying glasses. These should be so designed that they do not obstruct work, interfere with binocular vision or by colour fringes make vision tedious.
(4) Binocular microscopes. These have been used increasingly to over-come resolution of fine work. They may be of high or low power, worn as spectacles or be conventional. Binocular enlargement may readily be obtained, but the limit of human manipulative ability and physiological tremor may be the limiting factor.

6. Job specification. In analysing the suitability of a job for a worker, where visual function has been investigated, the following questions must be asked:

(1) What degree of visual acuity (near, middle and distant) is required?

(2) What degree of colour defect is acceptable?

(3) Is stereoscopic vision (near and distant) essential?

Detection of visual defects;

7. Testing vision. A variety of apparatus has been marketed to permit rapid screening of workers for the various aspects of vision under standardised conditions.

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8. Although logically one should evaluate the job requirements before determining the fitness or otherwise of the applicant, this is rarely carried out. Degrees of colour defect important for wiremen may be of little consequence to bus drivers, similarly good stereoscopic vision at a distance may be essential for crane drivers yet not for fitters. A myope may be well adapted for fine work involving the work being close to the eyes and should not necessarily be classified as unfit for work.

9. The following outlines tests of the three aspects of vision mentioned above:

(1) Tests of visual acuity. Measured by the ability to read test charts of letters of graded sizes. Tests are made at normal near point and at six metres (20 feet). By stimulating it may be possible temporarily to read "normally" but this is not possible for an eight hour shift. As carried out with hand-held cards for near vision and wall charts for distant vision in indifferent lighting conditions and with charts in a poor physical state, the tests, although scientifically inaccurate, may be consistent with the poor lighting conditions of the workplace.

(2) Tests of stereopsis. Tests may be made of ocular convergence ability by means of Maddox Wing, Maddox Rod or the simple screen tests. Defects of convergence and divergence may occur both in the horizontal and vertical planes. When "fresh" it may be possible for the individual to correct the inherent imbalance but with fatigue the defect is unmasked.

(3) Tests of colour perception. Tests of colour recognition based on sorting, naming or matching may be for the dark-adapted eye or for conditions of good illumination. All tests as currently practiced unfortunately may pass defectives and penalize normals.

10. Investigation of complaints. In analysing a job where there are complaints of eye strain, conjunctivitis or headaches, the following questions must be asked.

(1) Are all the visual requirements of the job met?

(2) Are the illumination circumstances defective?

(3) Are there other causes of eye irritation present (irritant volatile liquids and gases, ultra violet and infra-red, vernal conjunctivitis, and related conditions, acne rosacea, etc.).

(4) If the process is an ancient one and the physical conditions constant (for good or bad) for years, why has the complaint been made at this moment in time? It may well be that there are provoking factors of a social, personal or departmental nature forming facets of the whole problem.

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Complaints about heat, cold, humidity, stuffiness and draught:

11. Stuffiness. This may be applied to the aroma of humanity, tobacco or other aromatics noted on entering a room or to ear nose and throat discomfort. Alternatively it may be complained of when the effective temperature at head height exceeds that at floor level by greater than 1.5°F.

12. Draught. An air speed that produces disagreeable cooling as distinct from that which produces comfort and freshness. Even under severe conditions of radiant and humidity discomfort there is a limit to the air speed that is tolerable. Occasionally the 'cold radiation' effect of sitting hard by a single glazed window in winter may be complained of as a draught.

13. Heat. The combination of severe heat and physical effort lays a considerable burden on the cardio-vascular system. The effectiveness of protective measures (physiological and by shielding) experimentally is measured by the ability to maintain the rectal temperature within safe limits and to protect the heart from overload. In practice monitoring by pulse rate is effective. It is unsafe for workers to continue working when the pulse rate exceeds 120 beats per minute.

14. Fitness for work implies both the ability of protective measures to prevent overloading the heart and thermostatic control and the fitness of the individual to work in protective clothing.

15. When conditions are severe it may be necessary to carry out work that produces maximum permissible load in short period. Under these circumstances the duration of rest periods should permit return of the cardiovascular system to a gentle rate of working.

16. Loss electrolyte and water by sweating requires appropriate replacement. The nuisance of working at higher temperatures should not be confused with the hazard of physical overload.

17. Cold. In examining for fitness to work in extreme cold, ordinary fitness is required (chronic bronchits, Reynaud phenomena, peripheral arterial disease, myocardial ischaemia and arthritis are contraindications). Truck driving does not make great physical demand but muscular fitness may be required as for meat handlers. The solitude and the discomfort of cold-room work are such that natural selection rapidly eliminates the psychiatrically unsuitable. Acclimatization to cold is a physiological adaptation that supplements the adopting of protective clothing.

18. Thermal comfort. This is concept that covers those combinations of air temperature, radiant heat balance, air speed and humidity at which the majority feel comfortable. Within this framework there are maxima and minima for these features.

19. In any large floor area, be it office or factory, there will be microclimates developing resulting from architecture and machinery. The clothing of workers will vary as will the amount of physical effort.

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The following are the statutory requirements:

The Factories Act, 1961 requires a minimum temperature one hour after start of work or 60°F when a substantial proportion of the work is carried out sitting and thermometers must be displayed.

The Offices, Shops and Railway Premises Act, 1963. This requires after the same period a temperature of 60.8°F (16°C).

Action:

20. Investigation of complaints of stuffiness. Dealing with malodorous atmospheres is simple and the treatment is adequate ventilation. Masking the aroma by scent sprays or destroying the sense of smell by ozone is to be deprecated. Where the thermal gradient appears to be at fault this requires to be measured appropriately: thus if due to overhead radiant heating, e.g. overhead steam pipes, ceiling panel space heating or lighting fittings two black bulb (bolometer) not silver bulb thermometer reading are indicated. The only remedy short of redesigning the heating or lighting system is to increase air speed at head level, checking results with the victim and perhaps by means of a katathermometer. Where stuffiness is an ear nose and throat affect correction of humidity will be required.

21. Investigation of complaints about draughts. In certain situations draught is unavoidable: arthritics and bronchitics are well advised to keep clear of these jobs. The treatment is to avoid draught generation, to protect the individual or to increase the effective temperature.

22. Investigation of complaints of excessive heat. In considering the fitness of an individual to work at high temperatures apart from high motivation the following factors should be considered:

(1) Fitness of the cardio vascular system. Loss of reserve due to myocardial ischaemia or hypertension should be noted.

(2) Fitness of skin. Most lesions do not do well in a hot sweaty environment and any impairment of sweating ability is inimical to temperature control.

(3) Fitness of ear, nose and throat to tolerate dry or hot humid atmospheres. Other aspects such as dust, dirt, irritating fumes and physical work.

23. Patients with histories of renal calculus should avoid this type of work with its hazards of urinary concentration.

24. Heat shields to reflect radiant heat and the provision of insulated cooled clothing are available to permit work near to furnaces and in ovens. Their provision may to some extent reduce requirements for fitness.

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25, Investigation of complaints about thermal discomfort. In investigating complaints of thermal discomfort in a large area it is not to be expected that one climate will suffice for the lightly clad myxoedematous patient seated by a wintry window and the thyrotoxic well clad male lifting heavy components to a fiercely radiating machine. Studying the diagram that precedes this section will suggest stratagems whereby both workers may be assisted.

26. Situations of environmental discomfort may arise that are not obviously amenable to solution. However the investigation in itself may be of benefit and the provision of facilities for moderating the microclimates under the personal control of the complaint (a window that may be opened; a small personal fan or a radiant heater) though scientifically of low efficiency may make the situation more tolerable for the worker.

27. Complaints about climate, as about lighting and canteens, while justifiable may also indicate disease of departmental and company morale that merits coincidental treatment if the environmental treatment is to effect a permanent cure.

Seating and the Worker:

28. Seating the healthy. The chair and work bench or table should bear relation to the floor and to each other so that:

(1) The user's arms can work freely. This determines dimensions of chair arms.
(2) The feet (allowing for shoe heels) can be comfortably placed on the floor or a foot rest. This determines seat height.
(3) The knee can be kept at a right angle.
(4) The seat should not compress the calf or back of thighs (seat height, shape and upholstering).
(5) The back of the chair supports the lumbar spine correctly (chair back).
(6) Change of posture is permitted to the extent of allowing the legs to be crossed without altering the relation with the work surface (height of desk and dimensions of knee hole).

29. While the range of human dimensions is wide, a compromise can be determined for fixed seats that will suit 80% of the population. Adjustable seats and/or the provision of the appropriate work surface height, of foot rests and additional seat pads will allow maximum comfort and a minimum of fatigue.

30. The desk or work surface should be such that too high or low a reflectance is avoided to prevent harsh contrast between work, its immediate surrounds and general room conditions. This stresses the interdependence of different facets of ergonomics.

31. Seating the disabled. The worker in the wheel chair is well catered for as to seating as it is obvious to an employer that bench height requires adjustment. For the worker with degenerative joint disease affecting ankle, knee hip or lumbar spine that is not ankylosed then not only is a chair matched to floor and desk/bench height highly desirable, but there must be facilities for changing posture to prevent 'seizing up'

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to the extent of the work permitting intervals of standing and walking. Where there is ankylosis, by trial and error suitable adjustment can be made to render the worker tolerably comfortable.

Standing Work:

32. Work is often carried out standing because no thought has been given to its being carried out sitting down. Nevertheless it is rare to find bench or machine height suitable for standing work. A machine operator may be poised:

(1) with a foot on a pedal operating the machine clutch producing a pelvice tilt and lumbar scoliosis;
(2) gazing at what was hitherto head level to check the rotating turret to see the correct tool is presented;
(3) reaching to the left three feet away at knee level to operate a wheel which turns turret mechanism for a cutting tool;
(4) reaching with the right hand to a distance at waist level and to the right, four feet ahead;
(5) gripping with four fingers of the right hand, the thumb being used to operate a stud button.

33. The structure of most machine tools consists of a power unit, a cutting tool, a work piece traversing mechanism, with controls for operating and gauges for measuring, loosely knit with sheet steel. The arrangements of controls and gauges on a typical lathe were never designed for an able-bodied human being to operate let alone a disabled person.

34. The problem is more severe for the disabled who suffer more rapidly than the normal worker. A machine operator may also act as setter which involves lifting or in the absence of a bench feeder he may be required to carry materials and completed parts.

Movements of the hands:

35. Gripping. For an effective grip all four fingers and thumb should be used and there is an optimum size of fist. The grip is weakened when the thumb is separated for pressing a button.

36. In the hand tools shown in the figure, the remedy was to use a lever not a button switch. Different sized hands will be able to grip at maximum force if the objects presented are of the appropriate size. Unfortunately women will be provided with hand tools that are too large for optimal grip. This combined for example with the necessity to drive self tapping screws forcibly (particularly where there are other factors such as faulty components and imperfectly maintained apparatus) predisposes to a high incidence of tenosynovitis. (See 'Heat Conditions and Tenosynovitis' - 5).

37. The arthritic hand may grip better if the diameter of the object oto be gripped is expanded but even then it is advisable to avoid forceful repetitive gripping action. The weight of a hand tool may also be relieved by using a gantry for its support.

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The operator-machine relationship:

38. Much has been written of a philosophic nature on the subject. Of interest are the observations that:

(1) too much information militates against safe and efficient working;
(2) too little information militates against safe and efficient working;
(3) in the absence of high motivation vigilance can only be preserved for about half an hour.

39. The first accounts for the 'impossibility' of driving a train safely, the second and third account for errors made in such jobs as fault finding or radar scanning when points of interest are few and far between and periods of inspection long.

40. The grouping of controls on a machine should bear some relationship to the parts of the system involved and the movements should produce the anticipated result

41. A difficult point is that of on-and-off toggle switches. Standard practice in this country is down for 'on' whereas elsewhere one switches up-wards for 'on'. Accidents occur when in emergency the deeply ingrained response defeats the appropriate response.

42. As with grouping of controls so dials should bear some relationship to function. Many machines present more information than is required by an operator. The typical example is that of the test equipment fit for laboratory use with twenty switches and as many dials being used to test one function only, particularly when a yes-no answer is required rather than a reading on a scale (no matter how ergonomically designed the scale).

43. The choice presentation of information by dial and pointer or digitally has rhyme and reason. Digital presentation gives rapid information but the pointered dial indicates change more readily.

44. Motivation: Faults of lighting, heating, noise and physical design may be endured, where for reasons of prestige or money the subject is highly motivated. For this reason it is a mistake to extrapolate from one situation to another and an objective ergonomic improvement is doomed to failure unless the totality of the exercise is embarked on including the participation of the worker in the scheme.

45. The 'ergonomist'. In practice, no one individual can be expected to have a command of all the disciplines involved, namely those of engineering, work study, psychology and biology. The logical application of experience is the basis of ergonomics and the final common pathway is the work study engineer, by which is understood a specialist in designing jobs and measuring performance.

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46. Travel to work. Disability may be such that travel to work is possible by public transport. It may even be possible to travel in the rush hour. Otherwise other employees may be prepared regularly to provide transport in the absence of personal transport.

47. Travel at work. In the vast factory site general parking facilities may be well away from the work place; special arrangements should be made for the disabled. If the work place is up or down stairs, can the disabled person manage there, or can suitable re-arrangements be made? The siting of lavatory accommodation may be critical and access to wheelchair must be determined.

48. Sitting work. Is the work surface adjustable to a wheelchair? Are ergonomic aspects of seating, bench height and work layout compatible with disability? To what extent can they be adjusted to suit?

In the case of the arthritic, are there facilities for optional change of position to prevent joints 'seizing up'?

49. Standing work. The energy expenditure of standing coupled with the extraordinary postures demanded in operating machinery are inimical to the well being of patients with arthritis of spine and lower limbs. Varicose veins deteriorate with prolonged standing stock still. It may be possible to modify processes so that they may be readily carried out with greater efficiency seated or again it may be possible to alternate between sitting and standing.

50. Pedal-operated machinery. When the worker is seated and no force is required, pedals may be a desirable alternative to hand-operated levers. Where carried out standing even in the absence of force requires a drastic change is posture ill-tolerated by those with arthritis of the spine.

51. Right and left hand work. Forceful gripping work may be precluded by disease or deformity of hand and forearm. Where there is functionally one hand only, careful thought must be given before exposing it to a severe hazard capable of leaving the patient with no functioning hands. The amount of force required may be reduced to non-hazardous levels by change of tools and work study. Thus a hand tool with slight modification may require a less forceful grip (increasing or reducing the diameter of the handle), and the use of a well maintained specific tool such as a wire cutter will use less effort than an indifferent pair of pliers-cum-cutters. Thought given to job design may allow for increased physiological rest rendering it more suitable to the healthy as well as the disabled.

Left handedness is rarely a demerit but may be found to be so in certain assembly line work.

52. Fine fingering and rapid movement. It will be obvious which neurological lesions and orthopaedic diseases preclude this type of work.

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53. Lifting. Even where 'light sedentary work' is specified it is well to enquire about lifting and carrying. The absence of a bench feeder may necessitate the 'light sedentary worker' carrying supplies of his raw materials and removing finished work. Or again if required to act as a machine setter in addition to 'sedentary machine operating', this may involve forceful unlicking of chucks and lifting of parts of machine and tool.

54. Bending and stretching. Where disability contra-indicates this activity and even in the presence of health it is often possible by job layout to restict all work parts and components to within arm's reach: use of tiered trays and the inclined plane bring the work surface to hand. Bending to reach controls may be obviated by resting the controls.

55. Visual requirements. With further planning, it may be possible to reduce the demand for acuity. (See para 2). The partially-sighted and the blind may be suited to work by adaptation of apparatus. Organisations such as St. Dunstans, Royal National Institute for the Blind, Blind Persons Resettlement Officers and Training Officers and Industrial Advisers to the Blind Limited provide an advisory service to industry.

56. Hearing. Few jobs demand perfect hearing ability; however, there is the overall requirement in the large factory for warning signals to be heard. These may forewarn the appearance of trucks or ladles of molten metal, the start up of printing presses, or the impending disaster. The deaf should not be left at the mercy of the sound signal. They should be banned from departments where sound signals are life saving. As for safety in the curtilage of the factory the wearing of an arm band will warn truck drivers of the futility of giving signal of approach by the horn.

57. Heat, cold, wet, and humid conditions. Too many sufferers with bronchitis and asthma have become fatally ill, because they have been urged to take job in the fresh air, where a more equable climate was really indicated. The relevant conditions are laid down in this section, under the heading of complaints about heat, cold, humidity, stuffiness and draught.

58. Skin irritants, sensitisers and degreasers. Normal people should not be exposed to these hazards unprotected. Unfortunately protective devices lapse or act as irritants or sensitisers. Insofar as a skin lesion predisposes to injury from external irritants and sensitisers, it is unwise to expose a patient with active disease to known hazard. Care must be taken not to exclude fit people from work by reasons of irrelevant lesions. Ultraviolet light sensitive (iatrogenic or endogenous) workers can either avoid ultraviolet light or wear barrier cream on exposed parts.

59. Lung and ear, nose and throat irritants. Patients with otitis externa, otitis media, sinusitis, bronchitis and conjunctivitis may suffer unduly from irritants such as butanol and solvent naphtha, irritants to which the majority adapt.

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60. Lung sensitisers. The atopic patient becomes sensitized readily to allergens and therefore should be advised to avoid exposure to potent sensitizers, animal, vegetable and mineral as subsequent removal from exposure is no guarantee of recovery.

61. Eye hazards. Patients suffering from monocular vision and retinal, chorodial or lenticular disease or receiving therapy such as chloroquin should avoid exposure to further hazard. This avoidance may be absolute, as in eschewing work with lasers or qualified as in the use of protective goggles where there are mechanical hazards (See 'Eyes' - 25).

62. Hearing hazard. (See 'Noise' - 42).

63. Lung hazard, A worker who has succumbed to one dust hazard should avoid another. Similarly a worker with impaired lung function should not risk further damage.

64. Liver hazards. The patient convalescent from hepatitis, the cirrhotic and the diabetic should avoid exposure to range of chemicals with hepatotoxic effects or requiring detoxication by the liver.

65. Kidney hazards. The worker with nephritis, gout or diabetes should avid exposure to such diverse materials as carbon tetrachloride, lead, mercury and certain nitro and amino compounds of benezene and phenol.

66. Blood hazards. As a general principle patients with hyperactive bone marrow (chronic haemorrhage or haemolysis) should not be exposed to ionizing radiation and possibly the same should apply to benezene exposure with a view to leukaemogenesis. Patients with anaemia, whether due to haemorrhage or haemolysis or dyshaemopoiesis should avoid exposure to lead and chemicals causing both methaemoglobinaemia and toxic anaemia.

67. Central nervous system hazards. The epileptic should avoid those factors that provoke attacks such as stroboscopic effects of lights and machines. (See 'Organo Phosphorus' - 47 and 'Methyl Bromide' - 38).

68. Cardiac hazards. Patients with evidence of myocardial disease should avoid exposure to such substances as carbon disulphide, trichlorethylene and causes of methaemoglobinaemia.

69. Flame, acid, glass, machinery, and heights. The epileptic and the patient unstable because of vertigo or leg weakness or with weak grip, should not carry glassware or corrosives. The epileptic if uncontrolled is at risk from machinery and ladders and a risk to others. However, care must be taken not to penalise the balanced epileptic or the nocturnal epileptic.

70. Solitary work. Certain temperaments may find work in isolation tolerable or even attractive but it may be equally intolerable to others. The individual's preference should be sought.

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INDIAN ASSOCIATION OF OCCUPATIONAL HEALTH (KARNATAKA BRANCH)

Seminar on PREVENTIVE HEALTH MAINTENANCE IN INDUSTRIES

OCCUPATIONAL HEALTH IN THE AGRICULTURAL INDUSTRY IN INDIA

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Importance of Topic

Work on the land is man's oldest occupation. Between 70-75% of the Indian Labour Force in working in the agricultural sector in which we include farming, the plantations (organised agriculture), forestry, livestock and animal husbandry and a host of home based cottage industries which are mainly involved with the processing, refining or manufacture of food, clothing and household goods from the agricultural produce and/or its wastes. Even though this sector of our working force maintains literally all of us through its regular, strenuous work, their health and especially the hazards of their occupation have not received the attention and scientific research they deserve. In addition with the application of modern technology to the production of crops and to animal husbandry, the peasant today is being exposed to newer hazards of which he has neither the requisite basic information or the use-experience introduction of mechanisation, chemical fertilisers and a very large rang of pesticides are adding a new dimension to the health problems of the unsuspecting agricultural population. The tragedies of the Bandipodu fy the mystery diseases of Sagar in Shimoga, the endemic arthritis of Kol all events in recent history which have brought to light only to well new problem and hence the relevance of their paper.

Classification

To classify the agricultural occupations in India, for the purpose of scientific study, the following scheme may be used:

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AGRICULTURAL INDUSTRY IN INDIA (CLASSIFICATION)

A. PRODUCTION

1. Unorganised sector - Cereals, Pulses, Oilseeds, Cotton, Jute, Sugar cane, Vegetables, Fruit, Fodder
2. Organised sector (Plantations) - Tea, Coffee, Rubber, Spices
3. Forestry
4. Livestock/Animal husbandry - Poultry, Piggery, Cattle and Sheep/Goat keeping
5. Fisheries
6. Sericulture

B. PROCESSING - HOME BASED RURAL COTTAGE INDUSTRY

1. Wood processing - i. Sorting, Debarking, Storage
   ii. Milling, Pounding, Grinding
   iii. Oil manufacture
   iv. 'Gur' manufacture
   v. Distillations
   vi. Drying, Pickling
2. Weaving - Cotton, Wool, Jute, Silk
3. Rope making - Jute, Hemp, Sisal, Coir
4. House hold items - Bamboo, Cane, Straw
5. Farming implements - Local smithys, Carpenters

C. RURAL ARTISANS

1. Masons/Brick kilns/Tile manufacture
2. Pottery
3. Leather work
4. Handicrafts
5. Metal smiths - iron, brass, tin, gold
6. Miscellaneous

Situation Analysis

1. The Agricultural Worker
2. The Agricultural Work
3. The Agricultural Implements
4. The Agricultural Chemicals
5. The Health Organisation
6. The Occupational Diseases

1. THE AGRICULTURAL WORKER

a) All those persons who are engaged in cultivating harvesting and treating or processing agricultural produce and stock farming and breeding

b) In India more than 70% of our labour force is in this category (1971 census)

c) He has no well defined status like the industrial worker, because

i. He is dispersed over all the regions of the country - many quite inaccessible

ii. He/she are usually unorganised

iii. Lack of general education and or vocational training

d) He/she belong to all age groups since agriculture is one industry which employs all sections of the population - each one according to his capacities

e) He/she has to support a larger dependent population since there is usually a higher percentage of women and children and old people compared with the work force as a whole

f) Being part of a tradition-bound- joint family set-up, he is by nature more superstitious caste-ridden, culturally bound and resistant to change and new ideas

g) With the process of rapid urbanisation and industrialisation and the great attractions of the towns and cities the working population of the villages are being gradually drained of some of their most enterprising, creative and intelligent sections leading to an internal brain-drain from rural areas to cities which has very important sociological and political implications.

h) The agricultural worker may be classified into three principal categories:

i. The share croppers - who work land owned by a person to whom they owe a part of their harvest

ii. The tenants - who rent out the land for a few years at a time

iii. The wage earners or landless labourers - work on a yearly/seasonal basis

iv. The bonded labour - special to the Indian situation

Precise information of the numbers and characteristics of these categories are lacking in our country.

i) The agricultural worker includes men, women and even children. The latter work in agricultural related occupations virtually from the time they begun to toddle around the house and this is with certain detriment of their physical and intellectual development. This leads to a large percentage of absenteeism from school and a high drop out rate. This feature is particularly important in the light of the fact that 1979 has been acclaimed the International Year of the Child.

2. THE AGRICULTURAL WORK

Agricultural work consists primarily of

i. Production of food stuffs and raw materials for industry (this includes cultivation, harvesting and care of plants)

ii. Breeding and rearing cattle and other animals and birds

iii. Processing and conversion of produce of animal and plant origin

The work has specific characteristics which determine the types of the environment and the type of safety and health problems that the worker has to face (ILO Volume 1)

(1) Work is carried out in the open for most of the time exposing the agricultural worker to varying climates and meteorological conditions (heat, cold, ~~ar~~ rain, storms etc)

(2) The seasonal and often pressing nature of the job which demand i. long hours of work; ii. physical effort; and iii. speedy execution

(3) The frequent changes in the type of work undertaken by the same person which prevents

i. demarcation of duties; and ii. rotational system of work and rest very difficult

(4) The manifold contacts with animal and plant world leading to dangers of

a. Infectious or parasitic diseases;

b. Bites/stings;

c. Exposure to dusts containing fungal spores or allergy producing substance;

d. Exposure to toxic or irritant vegetable juices

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(5) The use of a wide range of agricultural chemicals giving rise to serious risk of poisoning by skin absorption and or inhalation

i. Pesticides;
ii. Fertilisers;
iii. Fungicides;
iv. Herbicides;
v. Seed dressing

(6) The considerable distances between home and work place especially for movement of flocks over pasture lands leads to

a. considerable time and energy in travelling;
b. increased risk of commuting accident;
c. regular meal hours and medical care uncertain

(7) The living conditions of the workers are often primitive and unhygienic and the environmental sanitation of the surrounding rather poor

(8) The great diversity of working methods

i. Manual labour
ii. Small implements
iii. Larger mechanical methods
iv. Agricultural machinery

(9) The difficulty of prescribing and applying standards and regulations of safety and health in small farm units, particularly in our country.

(10) The employment of much casual seasonal labour without

i. any real occupational qualifications;
ii. ill informed as to risks and preventive measures
iii. physiological unqualified for nature of work (mothers and young children)

3. AGRICULTURAL IMPLEMENTS/MACHINERY (Technology)

The technology in Agricultural Industry can be broadly divided into two major groups

A - Agricultural Implements -- those tools and instruments which are operated manually or are worked by draft animals such as oxen, water buffaloes or horses. These are mainly used for

a. land clearance
b. seed bed preparation - plough/puddler/cultivators/harrows

c. planting - attachment to ploughs and cultivators

d. intercultivation - hand hoes, spades, rakes, forks, pick axes

e. plant protection - sprayers, smoke generators, flame throwers
soil injectors, fumigators, bird scarers

f. harvesting and threshing - sickles, scythes, cutlasses, rakes,
pitch forks, matchetes, fodder cutters or choppers,
winnower

crushers, (sugarcane) shellers (corn) (paddy rice) decorticators (groundnut) polishers (turmeric)

g. Miscellaneous

- yoke of draft animals
- wheel barrows
- mhoarers/hand clippers
- water spraying devices

The main hazards from agricultural implements are

a. Physical injuries from cutting edges of equipment

- small injuries become serious (inadequate medical facilities)
- seasonal pattern
- danger of tetanus
- lack of arm/hand/feet protection

b. Cumulative ill effects to the health of the worker over a period of time due to handling of

- poorly designed and heavy implements
- in climates with extreme conditions

B - Agricultural Machinery

This is the machinery which is designed to manipulate soil and render it more suitable for crop growing, seed sowing, applying agricultural chemicals, plant protection, harvesting and storing crops

There is an extremely wide variety of machine, but these are essentially an arrangement of gears, chains, belts, knives chutes suspended in a frame stationery or mobile which perform the desired operation while moving across the field

- The major groups are:

a. soil tillage machines; b. planting machines

c. cultivating machines d. forage harvesting

e. ~~fora~~ grain/fibre/vegetable harvesting

f. transport/elevating machines

g. agriculture chemical applicators

h. sorters/packers
i. power plants/electric motors

The machinery exposes the worker to three main types of hazards

i. Traumatic injuries such as cuts, crushing, burns, fractures, amputations

ii. Organic injuries caused by noise and vibration from the machine

iii. Health impairment caused by toxic substances such as agricultural chemicals and engine exhaust fumes

4. AGRICULTURAL CHEMICALS

One of the most significant developments in the agricultural industry in India in the last 3 decades, is the extensive introduction and application of agricultural chemicals to tackle various problems

1. Pesticides i. organochlorine
ii. organophosphorous

2. Fertilisers i. ammonium nitrate } Nitrogenous fertilisers
ii. urea } phosphatic
iii. others } potassium
} Trace element

3. Fungicides - foliage, turf, soil, seed dressings, space fumigants
4. Herbicides - arsenicals, borates, chlorates, Cu SO4
Ammonium sulphamates, diquat, dinitrocompounds,
5. Rodenticides

The toxicity and hazard of all these chemicals when used without proper information, precaution or protection is too well known to bear any repetition.

5. THE HEALTH ORGANISATION

Excluding the agricultural workers who are employed in the organized plantation sector and who are therefore covered by the plantation Labour Welfare Act, all the other workers are not provided by any specific O.H.S. except the medical cover which is provided by the peripheral health service infrastructure of Primary Health Centres and sub-centres. Most of the medical personnel are unaware and uninformed of the occupational health problems of the agricultural workers and rural industries and hence preventive

health maintenance and safety is sadly neglected. Neither the medical colleges or medical professionals in general nor the Agricultural Colleges/ Universities or the agricultural scientists have highlighted or have undertaken research in these fields and hence what should normally have been one of the highest priority areas has been grossly neglected.

6. THE OCCUPATIONAL DISEASES

Diseases principally contracted, occasionally contracted and questionably contracted through agricultural occupations, have been classified by WHO/ILO as follows:

OCCUPATIONAL DISEASES OF AGRICULTURE

CATEGORY I

Principally contracted through agriculture

Viral

Viral encephalitis, tick borne

Viral haemorrhagic fever, tick borne

Bacterial

Anthrax

Brucellosis

Leptospirosis

Tetanus

Tuberculosis, bovine

Tularemia

Parasitic

Ankylostomiasis

Schistosomiasis

Rickettsial

Q-fever

CATEGORY - II

Diseases occasionally contacted through Agriculture

Viral

Rabies
Rickettsiosis
Viral encephalitis, mosquito borne
Viral haemorrhagic Fever, mosquito borne

Bacterial

Plague
Tuberculosis, human
Tuberculosis, avian

Parasitic

Hydatidosis
Malaria

Rickettsial

Scrub typhus

Dermatitis

Dermatitis

CATEGORY - III

Diseases exceptionally contracted through Agriculture

Viral

Viral Fever, tick borne
Viral Fever, mosquito borne
Cow pox
Foot and Mouth disease

Fungal

Actinomycosis
Blastomycosis
Histoplasmosis

Parasitic

Filariasis
Leishmaniasis
Onchocerciasis

7. Occupational Hazards in Agricultural related industries have been described and a review of literature suggests the following

A - Plantations (General)

i) Physical Hazards - Inclement weather
ii) Chemical Hazards - Agricultural chemicals
iii) Biological Hazards i) Hook worm
ii) Animal & Snake bites
iii) Infective/parasite disease
iv) Mechanical hazards Hand injuries

Specific (Suggested)

i) Tea dust - Tea workers Asthma
ii) Coffee - Crush or amputation injuries and electric hazard of drying machines
- Burns
- Fire & explosion hazard
- Allergic reactions of skin, mucous membranes and respiratory system have been encountered with persons handling green coffee possible allergen - chlorogenic acid (Finland Mortonya coffee roastery workers)
- Heat or 'thermal' exhaustion in coffee plants
- Coffee wastes (emission of odours
(Solid wastes into water sources increasing
(its B O D
- Extrinsic allergic alveolitis

B - Agriculture

i) Dermatitis of hands - in workers reeling raw silk
ii) Allergic skin reactions
iii) Slight Co poisoning - Headache, vertigo, nausea vomiting in rearing rooms (coal fires used to keep it warm)
iv) Respiratory disease - Chronic or allergic bronchit

C. Sugar Cane Cultivation

i) Hand injuries due to cutting tools

ii) Cuts or abrasions from plant develop into septic sores unless treated properly

iii) Snakes & poisonous insects

iv) Rat bites

D. Bamboo

i) Snake hazard

ii) Increased risk of tetanus with aliculs

iii) Accidental cuts

iv) Skin punctures

v) Hypertoxic of palms & fingers) handicraft workers

E. Cane

i) Snake hazard & venous insects

ii) Cuts from u knives

iii) Hypertoxis of palms and fingers

F. Coconut

i) Falls while climbing

ii) Injuries caused by falling nuts

iii) Snake bites

G. Coir

i) Skin infections due to workers standing in brackish water or wetting or soaking pores

ii) Sulphurdioxide in the bleaching process

iii) Accidents from unguarded machinery

H. Copra

i) Finely ground copra dust may form an explosive mixture which is readily ignitable

ii) Fires and explosions due to solvents used in oil extractions

iii) Skin disorders due to constant immersion in water (desiccator coconut factories)

iv) Lifting problems with gun sacks of copra - 70-75 kg.

v) 'Copra itch' due to infestation with mites

I. Carpet weavers

i) Skeletal deformities - squatting position
- Pit looms
- Scoliosis/ lordosis

ii) Eyesight disorders - due to eyestrain

iii) Hand & finger disorders - swollen finger joints, arthritis, neuralgias

iv) Hand tremors

v) Mechanical injuries

vi) Toxic hazards - dyestiffs - potassium or sodium bichromate
Ammonia, strong acids, alkalies

vii) Anthrax infection from raw wool

J. Straw

i) Straw dust dermatites

ii) Pyogenic infections of skin

iii) Rhinitis pharyngitis/laryngitis/tracheobronchitis

iv) Allergic bronchial asthma

v) Pulmonary mycosis

vi) Reactive inflammation of eye foreign bodies in the eye
Traumatic injuries.

8. What can be done to provide Preventive Health Maintenance for this high priority sector of workers

1) Need to highlight the importance of Agricultural Medicine and health hazards in the agricultural and home-based cottage industries in all forums dealing with occupational and industrial health.

2) Need to collect all the known data about this sector of industry

i) Labour statistics
ii) Demographic data
iii) Distribution by divisions
iv) Known health and safety problems in each
v) Traditional processes used
vi) Materials used

3) Need to plan out pilot epidemiological research schemes to study the hazards and health problems of each of these groups of workers
Already schemes to study the bidi workers, sericulture, coir workers, tea plantation workers and weavers are in progress or being planned by N O S H C and N O S S.

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4) Keen interest of the PHC Medical officers to the occupational health problems of the agricultural workers and rural artisans and to train the paramedical health personnel to educate the people on simple and effective health and safety measures. Elementary knowledge of these problems and their prevention must be included in all training courses.

5) Involvement of the agricultural universities and colleges in the study of the occupational health problems and hazards of the different agricultural occupations and the involvement of the agricultural scientists and agricultural engineers and agricultural extension officers in the thinking of the health of the peasant or farm labour in addition to the health of the plant or animal or the improving of production.

6) Involvement of the Fertilizer/Pesticide producing industries in improving the

i) Packing - leak proof containers etc.

ii) Labelling - especially in the regional languages

iii) 'Warning of hazard' communication

iv) Provision of preventive measures or almost information on these. to warn/educate and protect the illiterate peasant or landless labourer from the hazards of in the use of these agricultural chemicals.

7) Agricultural Medicine must become an integral part of our medical education and occupational industrial health services for the farmer must become an integral part of the comprehensive health care programme of the Primary Health Centres.

8) Involvement of all organisations/agencies and govt. bodies dealing with one or more of the groups mentioned in the classification earlier on - in the collection of an information base on that particular or group of occupations and supporting/sponsoring of research in the health and safety problems of the workers in that occupation.

9) Individual/Group health Education as part of the PHC work and the Agricultural Extension of the Block Development Agencies should be undertaken the newer hazards due to modernisation in agriculture .

10) Overall Socio-economic Development and General basic Education in which Agricultural medicine should form an integral part.

OUR AIM

India is a developing country progressing towards a better economy. The three potential factors for the economic progress are (i) establishment of Industries, (ii) improved agriculture and (iii) population control. The indices of success are, better production in the industry and in the field, and better health conditions of the labour.

Without human intervention, materials, money and machine would be sterile instruments, indeed. Hence the health of the industrial or agricultural workers is key to satisfactory productivity. Health and Productivity are reciprocatory and complementary.

Work upon which productivity depends has also its hazards. Apart from accidents there are many conditions which endanger health like, dust, noise, heat, toxic substances, fatigue, etc. Most of the hazards can be controlled if not eliminated by the joint effort of the labour, the management and the community.

MEN AND WOMEN AT WORK ESSENTIALLY ARE THE CREATORS OF ALL PROGRESS AND DEVELOPMENT. THEIR HEALTH AND WELFARE IS IMPORTANT FOR PRODUCTION.

IMPORTANCE OF MAN-POWER

Since independence in 1947, industrialization and urbanisation in Mysore State have been phenominal. There are 3,113 industries. The type of industries cover a wide spectrum ranging from cottage/home industries like weaving, beedies, etc., to larger ones, like steel, cement, paper, textiles, chemicals, plastic, confectionary etc., etc.

The total labour population is in the range of 4,95,454, (industrial labour 2,35,561, labour in mines 26393 plantation labour 77,068 and commercial labour 1,56,432). The labour population includes women as well as children. In addition to the above labour section, a considerable segment of our population is having agriculture as the main occupation.

DEVELOPING INDIA IS LIKE A MAN RUNNING UPHILL—IT NEEDS ALL THE HEALTH AND WELFARE.

HEALTH HAZARDS

The factory is like a battlefield. Industrial workers face many hazards depending upon the industrial process.

NOISE is a part of modern life. It not only threatens permanent deafness for certain workers but it also has a close relationship with productivity.

UNSATISFACTORY CLIMATE adversely affects productivity. High temperature, humidity, poor lighting and ventilation leads to lethargy and even accidents.

DANGEROUS GASES endanger health. Carbon monoxide from damp-furnaces, being colourless and odourless, deceives the victim to disability and death. In the manufacture of artificial fibres, workers run the risk of contact with carbon disulphide, which when inhaled in small quantities over long periods, can lead to depression, personality changes and even insanity. Compounds of cyanide have a wide use in electroplating and extraction of gold. These gases can kill a person in one or two minutes.

DUST particularly in cotton textiles and fertilisers, when inhaled over long periods result in a disease condition of lungs making the victims vulnerable to Tuberculosis.

METALS like lead cause poisoning among workers in battery factories and certain shipyards. Lead poisoning may result in mild complaints like abdominal pain (colic) or even permanent disability like paralysis.

In addition to the above conditions specific to industry, workers (agricultural as well as industrial) are amenable to suffer from diseases common to the rest of the community, like Malaria, Cholera, Diarrhoeas, Small-pox, Dysentrics. Tuberculosis, Leprosy, Trachoma, etc. They are also susceptible and suffer from other conditions like mal-nutrition and under-nutrition in addition to the disadvantages of frequent pregnancy, delivery and large families.

DRAG OF ILLHEALTH ON THE ECONOMY IS TREMENDOUS.

OCCUPATIONAL HEALTH—HEALTH EDUCATION

A properly planned, Health and Health Education programme can deal with the hazards and promote health. Occupational health work includes not only prevention of illness and accidents but also the improvements of the general health.

Machine can be adapted to man rather than man to machine. Fatigue can be diminished and monotony avoided.

Routine periodical medical check up of the workers can help in early detection, cure and prevention of many conditions.

Noise and dust can be controlled if not completely eliminated by proper ventilation. Exposure to toxic substances can be prevented.

Modern science has provided effective weapons to safeguard the health and welfare of the workers as well as their families. *But what is required is the willing co-operation and practice of the measures by the workers, their families, management and the society.*

Ignorance of the potential risks of the factory environment can have tragic consequences. Education of the managements labour and the community is basic to the practice of all preventive and safety measures. Simple practice like proper and hygienic house keeping, which often does not involve much expenditure is the fundamental way to reduce the level of danger.

JOB CAN BE ADAPTED TO THE HUMAN CAPACITIES—ANATOMICAL, PHYSIOLOGICAL AND PSYCHOLOGICAL.

EMPLOYEES STATE INSURANCE SCHEME

Employees State Insurance Scheme, is a part of the National Welfare Scheme under operation in Mysore State. It provides medical benefit to the insured persons and their family members. The services include diagnosis, treatment, follow-up, sickness benefits. ambulance facilities, etc. The scheme is now in force covering 50,000 employees and a labour population of 1,85,000 in places like, Bangalore. Hubli, Dandeli, Mysore, Mangalore, Belgaum, Gulbarga, Gokak, Davangere. Kollegal, T-Narasipur, Nanjangud, and Harihar. Under the scheme the Government have established a big hospital at Rajajinagar at Bangalore, created specialists services and also started a number of dispensaries with the personnel, for rendering the routine and emergency services.

The State has also a net-work of 1,777 health and medical institutions, Allopathic 1,342 and Indian Medicine 435, spread over the rural areas of the State to render preventive and curative services to the community. These institutions also provide routine health services to the labour population (industrial as well as agricultural) except those included in the Employees State Insurance Scheme.

DOCTORS, NURSES, SOCIAL WORKERS, HEALTH ENGINEERS AND ARCHITECTS CAN ALL CONTRIBUTE IN MAINTAINING PHYSIOLOGICAL AND MENTAL WELFARE OF THE WORKERS AND THEIR FAMILIES.

ORGANISATION OF HEALTH SERVICES IN INDUSTRY

4. INDUSTRIAL MEDICAL OFFICER FUNCTIONS DUTIES AND RESPONSIBILITIES

by

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1. THE INDUSTRIAL MEDICAL OFFICER—FUNCTIONS

The problem of providing medical service for the industrial worker both in large and small plants is in the interest of the government, employers, workers and all those interested in promoting better standards of life to reduce the losses sustained through sickness, accident and death. In a country as ours, such problems assume wide proportion owing to both the climate, the poverty and the ignorance of the people which has contributed widely to the existence of tropical and other epidemic diseases.

In connection with the sickness among industrial workers, few employers know the rates of sickness among their workers. Even in industrial concerns where doctors have been employed to provide medical relief, the incidence of diseases of occupation are totally unknown and the concept of such diseases is non-existent. It is, however, certain that a sickness and disease exact a heavy toll from the industrial population and has influenced the efficiency and the earning capacity of the worker to a marked extent.

While it is essential that a programme of instructing the management in the advantages of medical supervision be instituted by authorities concerned, it is of still greater necessity that the Public Health Service in the country instituted such a programme for the medical personnel. Our shortage of trained medical men is appalling. It is also sad to say that the medical men or the "doctor" in our industries and factories has not grown up with the Factories Act. It must also be realised that there is no substitute for days and months lost because of disabling, sickness, and no substitute for the lives lost in accidents.

The provision for industrial medical supervision is necessary, for, there are a large number of people in large industries and a larger number still in small factories. Also such provision must be provided step by step starting with factories and industries with special toxic hazards or where work is heavy or where there are a large number of youngsters, women or older workers. Efforts must also be made to stimulate Works' Committees to augment health and hospital facilities.

The factors upon which industrial medical supervision depends are :—

1. Those relating to industry or factory.

(*a*) Place, housing, transport, hospitals, climate, regionalisation.

(*b*) Number of workers employed—single or numerous units of small or large size.

(*c*) Type of work—heavy, dangerous, toxic or shift or transport work.

(*d*) Type of worker—men, women, youngsters, active or sedantary.

(*e*) Buildings—Obsolete, modern, transition, and expanding. In old and obsolete buildings where it is difficult to catch up with improvements in modern factory design.

(*f*) Contractors, men where first-aid arrangements for contract labour is necessary.

2. Those relating to the Industrial Medical Officer.

(*a*) Full-time—

(i) Organisation with over 3,000 employees with nurses or first-aiders. A set up including a headquarter and subsidiary units spread over the various production departments.

(ii) A regionalised administration with assistant medical officers, nurses, etc., for a group of factories.

(iii) A number of smaller units employing 50—250 people, with first-aiders.

(iv) A factory employing less than 3,000 people, with some special toxic hazards, with nurses, first-aiders, pathological laboratory assistance and requiring lot of research work.

(*b*) Part-time—

(i) to one or two units, in the course of ordinary general practice.

(ii) as examining surgeon to an expanding factory.

In any case even with the above circumstances basic principles for the provision of medical service are the same. There is a difference of degree only. The functions of the Industrial Medical Officer remain the same.

The Industrial Medical Officer must pay careful attention to the following outstanding points :—

1. Pre-placement examination of the worker to assess his fitness for work. The occupational selection of the employees is a problem of prime importance and it is this aspect of the medical officer's work which if adequately carried out brings the greatest applause and appreciation of the management.

The first contact with the medical department should make the prospective employee realise that here is a place where he can depend upon genuine help and consideration. Essentially, this scheme consists of dealing with job evaluation and meet with the medical categorisation of the worker. The Industrial Medical Officer must formulate his own scheme of categorisation in the form of a code which, to comply with essential laws of medical ethics, commands the trust of the employee and no confidential information regarding the medical state of the employee is passed on to the management.

The Canadian Army *PULEMS* system is capable of adaptation to any type of works. The essentials of a physical examination are :—

(1) Only a careful pre-employment examination enables sub-standard persons to be successfully placed in occupation.

(2) Anything less than a full examination is not fair to the worker or to the employer.

(3) Very few applicants are so unfit as to be incapable of any class of work.

(4) The object should be to indicate how each can be employed in safety to himself while performing his daily work efficiently.

(5) Routine mass radiography is valuable to detect pulmonary and cardiac pathological conditions.

(6) The categories of workers should be classified, as : fit for any work, no hazardous machinery, no heavy lifting, work at ground level, no extensive working, severe handicaps such as blindness, and rejection.

(7) At hazardous occupation, periodic examination should be the rule.

(8) The confidence of workers must be gained, they must appreciate that medical supervision is in their interests.

(9) Employees returning after illness of some weeks absence should be re-examined.

(10) Above all the industrial physician must possess "wisdom"; he must be the friend of every one.'

2. Second important principle of industrial medical service is the organisation of emergency treatment and arrangements for swift clearance of the acutely ill. It is not too much to impress that this service helps to improve relations in factory between the workers and the management and many a life and limb are saved which bring blessings in disguise from all concerned.

3. Arrangements for periodic health examination of all workers, a systematic check up, especially the examination of people about to be employed in departments where toxic hazards exist.

4. Arrangements for examination of workers and report on their health state.

5. Statutory examinations of—

(i) all young people entering industry;

(ii) periodic examination of these adolescents;

(iii) examination of people employed on dangerous occupations.

6. Provision for research. The opportunities available for the investigation of industrial health problems are innumerable and unequalled material is available to the keen, enthusiast and ambitious worker.

7. Education of the worker on health matters, and providing advisory and consultation service for every worker.

8. Keeping of medical records and their interpretation to the management.

9. Provision of adequate, prompt and skilful first-aid.

10. Provision of nursing and ancilliary services.

Industrial health supervision has three important aspects and it is the duty of the industrial medical officer to devote his time and energy to all the three aspects.

(i) The worker.

(ii) The work.

(iii) The working environment.

THE WORKER

It is essential to note the following things when considering the question of employment of people.

(1) Past history—especially the occupational history. This is most essential. Careful enquiries must be made to elucidate the exact nature of his job and the raw material or the by-products that he handles.

(2) Age and physique—physical fitness for the job he is about to handle or he is carrying out.

(3) Deformities and diseases—a physical handicap need not always be a bar to his employment. The job must fit the worker, not the worker to fit in the job.

(4) Social background and family history. Most of the present day illnesses have in their background an unsound social fitting.

(5) If the worker is exposed to toxic hazards, his periodic clinical examination should be directed to—

(*a*) General bearing, appearance, colour, skin and weight.

(*b*) Nose, mouth and eyes.

(*c*) Lungs, liver, kidneys, bladder.

(*d*) Muscular and skeletal system.

(*e*) Nervous system.

(*f*) Special investigations:

Urine,

Blood counts,

X-rays.

THE WORK

While it is essential to have a knowledge of the physical capabilities of the worker, it is of still greater value to be able to have a conception of the nature of the job that the man passed as medically or physically fit has to do. Such factors as the following about the work must be investigated:—

(*a*) Nature of Work—shift work, night work, work of arduous or monotonous nature.

(*b*) Demands of the work—demands upon muscular and skeletal system in terms of gross

or fine movements, weight lifting, standing, awkward positions, climbing, bending, kneeling.

(*c*) Strain on sight, hearing.

(*d*) The need for protective appliances or clothing, as in welding, chrome plating.

(*e*) The element of sudden danger or insidious hazard—danger from sudden explosions, or slow absorption of lead fumes.

(*f*) Individual or team work.

(*g*) Responsibility for the work or the safety of others.

(*h*) Working above or below ground level.

(*i*) Mental demands.

THE ENVIRONMENT

The industrial physician should have a working knowledge of the industrial processes involved in the works in order to prevent occupational disease. It is incumbent on him to make frequent inspections of the work-rooms to be able to assess the hazards. He should also possess a good knowledge of the clinical manifestations of occupational diseases to which the workers under his supervision may become exposed. He should know the prodromal symptoms as well as symptoms of disease when it is fully established.

The environment of the worker may be classified into 4 classes.

A. PHYSICAL

It is the physical environment which is the most difficult to control and also most important for maintaining the physical fitness of the individual. Such factors as ventilation, temperature, humidity, lighting, glare, noise, apparatus, machinery, work benches, seating arrangement, protective measures and their provision, play an important role on the health and well-being of the work-people.

B. CHEMICAL

With the increasing use of a large variety of chemicals in industry the risk from the use of chemicals is increasing and as such it is necessary for the industrial physician to have a knowledge of :—

(*a*) Toxic solids, liquids, gases, fumes and dust ;

(*b*) Accidents of gassing, explosions, dust hazards, insidious poisoning ;

(*c*) Dangerous processes covered by regulations ;

(*d*) Other processes carrying risk of industrial diseases.

C. BIOLOGICAL

Knowledge of epidemic diseases and other diseases not specific to industry as Anthrax, Ankylosmostiasis, Weil's disease.

D. PSYCHOLOGICAL

It is being increasingly realised that industrial psychology is a subject, the knowledge of which is very essential for the industrial physician. Such factors as monotony at work, anxiety, danger, fatigue, attitude of the worker towards the management and colleagues have psychological basis and their investigation is therefore necessary.

In the end, it is necessary to have an idea of the work of the industrial physician. His work is divided into that performed—

(1) in the work's surgery or ambulance room,

(2) in the factory, offices, canteen, welfare and safety department, etc.,

(3) in his own office, laboratories, etc.

2. DUTY AND RESPONSIBILITY OF INDUSTRIAL MEDICAL OFFICERS

Having such an interest in the health and the welfare of the workmen in his medical charge as has been described above, it is necessary to have some knowledge of the philosophy of industrial health, supervision, as provided by the factory doctor.

The principle of humanitarian service to labour is guided by certain standards of responsibility expected of the industrial physician, which are grouped under the heading of " Duties of Industrial Medical Officers ". In every such provision of health supervision, there must be pronounced magnificence and high ranking quality that will serve as a magnet to which all support essential to the success of that provision will be attracted. The composition of that support in our field embraces, employers of labour, the employees, the management, the general medical practitioner, and a wide range of others who directly or indirectly influence health supervision, who are affected thereby, or who have it within their power to aid in the prevention of industrial maladies. There must be a concentration of purpose in the magnificence and the quality of service, from which may be disseminated the allocation of responsibility pertaining to each interest involved. Realising that no matter how much planning goes into a subject its success depends entirely on the spirit of those engaged in its operation, it is essential that the industrial physician observed on his part the ethical rules which govern the professional relationships, between industrial physicians, their colleagues in general practice, and the workers and the staff under their professional care.

In this connection the management has a right to expect from the doctor—services that will be of use to all and which have a bearing on the general improvement of the morale of the workers. The worker also wants help and guidance and some one in whom he can put implicit faith when he feels like confiding his mental and physical ailments in the doctor.

The doctor has therefore two divergent kinds of people to please. In order that he can maintain a happy mean between the two, he should be governed by these ethical rules. He is always faced with the difficulty of expression of opinion to both. Under such circumstances he has to be prepared to accept rebuffs and criticism till he has blind faith of the two. It is during this trial period that he has to be very careful and watch movements. He has to be alert, on guard and with an open mind make investigations. He has to be on the look-out to know each worker individually in the earlier stages, and be able to get the confidence of the two around him. In the early stages he should act more as a colleague and not as a doctor. He is working as a member of a team and as such a high standard of work and code of conduct is expected of him.

In the disposal of the patients seen by him a great amount of tact and diligence has to be used and for this he should be prepared to ask for cooperation from the management in order that the interest of neither is jeopardised. He must arrange to guide the first-aider, the nurse, the management and the patient in cases of emergency illness. In order that conflicts in the team spirit be avoided, he should be guided by the following duties and responsibilities of an industrial medical service :—

1. He should carefully assess the suitability of his own methods of examination, paying special regard to the occupational history of the worker's illness.

2. He should arrange for all emergency or first-aid treatment at the place of employment of the worker and should make proper entries of the treatment offered and the instructions given to the patient or other responsible person as regards his disposal.

3. If it is necessary, in the interest of the patient, to continue treatment in the factory and where such facilities exist, he should, in consultation with the patient, arrange for such treatment.

4. He should have knowledge of hazardous occupations and while examining persons employed or about to be employed on such occupations he should be able to advise the management on the suitability of employment of such persons, or their transfer or retirement.

5. He should be prepared to advise upon the occupation of any worker, whose duties appear to be too heavy or otherwise unsuitable.

6. He should possess expert knowledge of short-term illnesses in order to avoid confusion with illnesses of malingering.

7. He should know statutory requirements of examination and those specially pertaining to the industry in which he is employed.

8. He should know his day-to-day responsibilities—

(*a*) his own executive functions.
(*b*) the discipline of his staff.
(*c*) the professional duties of his staff.

9. He should be prepared to collaborate with other departments in the factory and assist them with such advice and data relating to the worker, the work and the working environment.

10. In case, where a worker is being treated by another medical practitioner, and a report on him is needed he should, with the consent of his employer, place his special knowledge at the disposal of the attending practitioner.

11. All medical records of workers are confidential documents and they must be treated as such when in his custody.

12. All workers should be allowed free opportunity to consult him. No barriers to these consultations should be set up.

13. He should be prepared to discuss health problems of the family of the worker and these should receive his adequate attention.

14. He should be prepared to write health memoranda for the education of the workers on health problems.

15. He should pay special attention to people suffering from tuberculosis and people in the vulnerable group.

16. He should supervise the general sanitation of the works, and make necessary recommendations.

17. A large number of forms are always hated. There should be less codification on paper. A legibly hand written note from the doctor can do much.

18. Mistakes in diagnosis as well as in action may become "monuments". Guard against these.

19. He should keep liaison with other people and departments and agencies outside the factory engaged in medical services.

Local Hospital—
Casualty Officer.
X-Ray Department.
Skin Department.

General Practitioners.
Local Teaching Hospital or other Hospital-Department of Medical Research.
Pathological, Bio-chemical and Bacteriological Department.
Medical Officer of Health.
Certifying Surgeon for the District.
Indian Red-Cross or St. John Ambulance Society.
Medical Inspector of Factories.
Tuberculosis institutions.
The Provincial Inspectorate of Factories, Ministry of Labour.
Industrial Health Advisory Committee of the Indian Research Fund Association
Industrial Health Research Unit, All India Institute of Hygiene and Public Health.
The Indian Medical Association—Industrial Disease Committee.
The Chief Adviser of Factories, Ministry of Labour.

OCCUPATIONAL HEALTH SERVICES—Training*

A. F. HEREDIA**

To a great extent every branch of medicine is becoming not only specialised but superspecialised—namely it is becoming a matter of team work rather than of individual responsibility. This is more so in the field of occupational health, as I have already pointed out in my address yesterday. It is obvious that a doctor cannot be an expert in all phases of occupational health—he would require the assistance of various other experts like engineers, chemists, physiologists, psychologists, welfare officers, industrial health nurses etc. However, in matters of health, the physician will have to take the role of team leader and therefore he will have to be trained to take his proper place. Though he will have to know what to expect from each of his team mates, it is not necessary that an industrial physician be an expert in all investigations involved. He must, however, be a competent physician (which is his special line) and an expert in diagnosis, treatment and prevention of diseases commonly met with and of occupational diseases in particular. He should know the principles of public health. He should establish good connections with hospitals, private physicians and health authorities. He should be conversant with the nature of work involved in various jobs in his factory and of the risks to health in each.

Undergraduate Education: The qualifying doctor is being trained as a general physician for practice in the community. A large proportion of such doctors settle in towns (75%) or are employed there. If one realises that almost half the population of some towns is connected with industry, it would not be too much to expect that such a doctor should have some knowledge of occupational medicine. Without overloading the curriculum or placing undue emphasis on it, the following aspects of occupational health may be taught. I am glad to say that I was fortunately on the University sub-committee for advising on the syllabus in Preventive and Social Medicine, and my suggestion for the inclusion of occupational health in the teaching programme was accepted and has also now been recommended for inclusion in all the medical colleges by the Medical Council of India.

Syllabus: The following may form the syllabus: The development of the modern concept of occupational health.

Health aspects of the Factories Act and Rules.

Common occupational diseases, their diagnosis and prevention.

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* Paper presented at the symposium held on 5th April, 1959 on "Occupational Health Services," during the 7th Annual Convention of the Bombay Branch of the Society.

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Received for publication on 5-4-59.

Principles of industrial hygiene and toxicology. The total time taken will be 6 to 8 lecture periods and about 4 visits to factories. (total 12 sessions).

Certificate course: For those doctors who wish to join an industry or who are already employed in a plant, a special short course may be offered. A more intensive study of occupational diseases, industrial toxicology and of diagnosis, treatment and prevention will be required, and also a more detailed knowledge of laws relating to health in industry. Such a short course is most essential in order to develop the longer and more intensive diploma course. Most doctors will not be able to spare the time necessary for a long course; also they may have no guarantee that they will be employed in industry after the completion of such a long course. So the short course will answer the needs of the greater number.

Post Graduate Diploma in Industrial Health: This should be a course for the specialist in the branch. It should consist of two parts and cover one full acdemic year. The first part will be largely the general principles of public health. The second part will consist of lectures on industrial law and labour relations, various aspects of the industrial worker in India, social security, labour organisation, industrial hazards, toxic agents and industrial dusts, methods of examination and control, rehabilitation, industrial accidents and prevention, physiological hygiene, occupational diseases and industrial medicine.

Paper read at 27th Annual Conference of Indian Association of Occupational Health in February 1977 at Ahmedabad.

TEACHING AND SERVICE RESPONSIBILITIES OF A MEDICAL COLLEGE IN THE FIELD OF OCCUPATIONAL HEALTH.

By

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INTRODUCTION :

(1) In 1971 the working population of India was about 18.04 crores or 32.9% of the total population. Nearly 70% of this population were involved in agriculture as cultivators or labourers and the remaining in plantations, mining and quarrying, manufacturing, processing and repair industries, trade and commerce and the construction and transport industry (refer Table 1)

TABLE I
DISTRIBUTION OF WORKING POPULATION[1], 1971

Categories	Total workers in 1000	Percentage
1. Cultivators	78,176	43.34
2. Agricultural Labourer	47,489	26.33
3. Plantations, Livestock forestry	4,296	2.38
4. Mining & quarrying	922	0.51
5. Manufacturing, processing and repair		
a) Household	6,351	3.52
b) Other than household	10,715	5.94
6. Construction	2,215	1.23
7. Trade and Commerce	10,038	5.57
8. Transport, storage and communications	4,401	2.44
9. Other services	15,765	8.74

(2) Since independence the Government of India has through a system of National Five Year Plans involving massive industrial and agricultural development attempted to tackle the socio-economic problems of the country. During this process the working population more especially the non-agricultural occupations have been given higher priority in our social security system and

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numerous schemes and acts have been created to provide adequate cover to the workers against contingencies such as ill health and industrial accidents (refer Table II and Table III). Many of these Acts lay down provisions for basic health and first aid facilities for the working population in the form of a first aid centre, dispensary, part time doctor or full time factory doctor or through the services of ESI dispensaries and hospitals.

TABLE II

Social Security Schemes for Labour in India[1]

Employees State Insurance Scheme, 1948
Employees Provident Fund & Family Pension Fund Act, 1952
Payment of Gratuity Act, 1972
Death Relief Fund, 1964
Employees Family Pension Scheme, 1971
Coal Mines Family Pension Scheme, 1971
Coal Mines Provident Fund, Family Pension and Bonus Schemes Act, 1948
Workmen's Compensation Act, 1923
Maternity Benefits Act, 1961

TABLE III

Labour Welfare Acts in India [1]

Factories Act, 1948	Contract Labour Act, 1970
Mines Act, 1952	Mine Workers Welfare Fund
Plantation Labour Act, 1951	Dock Workers Welfare Fund
Bidis & Cigar Workers Act 1966	Motor Transport Workers Act 1961

(3) Rapid industrial and agricultural development since independence has added a new dimension to the public health problems of the country since increasing numbers of our working population both urban and rural are being exposed to the physical, chemical, biological, mechanical and psychological hazards of their new working environments. In addition environmental pollution due to industrial effluents is also becoming a serious hazard to the urban populations. A recent study conducted by the Central Labour Institute, Bombay, has revealed the extent of some

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of these hazards. To cite a few examples:"in the ceramic industry 10-20% of the workers have fallen victims to silicosis, bronchitis has affected 16% of the textile workers in Bombay mills alone, one out of every three workers in ferromanganese plants are suffering from ailments directly traceable to their occupational environment" and so the list reads on.

In a country like India where communicable diseases and nutritional deficiencies still take a heavy toll on the health of the population, occupational health cannot be expected to have very high priority in our health planning. However the Government has taken steps to study and solve some of these problems by establishing important research and teaching institutions in the country dealing with important occupational health problems (refer Table IV). The working population in the country can be protected from the hazards of their working environment only if a health service exists and the accumulated knowledge and research findings of these institutions are applied through it. Medical teams working in industries, plantations and other occupations either through ESI Scheme or through provisions in existing legislation have tended so far to provide a purely curative-clinic oriented service and a certification facility. However, a time has come when doctors working in industry and with other occupational groups must begin to provide a much more comprehensive occupational health service and the subject of this paper outlines certain remedial measures with specific reference to the role of medical colleges in the process of change. It must be added that even today there are certain public and private sector undertakings which do provide for a more comprehensive occupational health service for their workers but these are exceptions rather than the rule.

TABLE IV [3]

Occupational Health Institutes in India
Central Labour Institute, Bombay
Regional Labour Institutes, Kanpur, Calcutta and Madras
State Inspectorate of Factories
National Institute of Occupational Health, Ahmedabad
Central Mining & Research Station, Dhanbad
Industrial Toxicology Research Centre, Lucknow
National Environmental Engineering & Research Institute, Nagpur
All India Institute of Hygiene and Public Health, Calcutta
Occupational Health Division, ICMR

OCCUPATIONAL HEALTH SERVICE : Since the term 'comprehensive occupational health service' will be used often in this paper, it is necessary that this is explained at this juncture. Occupational health according to me is the practice of Community Medicine is a setting where the working population is considered as the community under care. A comprehensive health care

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system in an industry/factory/occupational environment must include the following basic functions enumerated by Schilling, 1973.[5]

1. Placing people in suitable work
2. providing a treatment service
3. controlling recognised hazards, secondary monitoring
4. Identifying unrecognised hazards - primary monitoring
5. Avoiding potential risks
6. Screening for early evidence of non-occupational disease
7. supervision of vulnerable groups
8. counselling and health education
9. surveillance of sanitary, catering and welfare amenities
10. environmental control outside the workplace

If occupational health is to become an important part of our health services it is imperative that medical personnel of all categories must be trained in the principles and practice of occupational health and in this context the medical colleges of the country have an important role to play.

ROLE OF MEDICAL COLLEGES :

a) Present involvement :

India has nearly 110 medical colleges with an annual output of over 13000 doctors. Many of them have joined and will be joining dispensaries, health centres and hospitals dealing with working populations but few of them would have had any preparation for it.

- The undergraduate curriculum in most colleges have if at all a few lectures in occupational health and probably an afternoon visit to a factory.

- Very few medical colleges deal with occupational health problems, fewer have occupational health units and only two offer postgraduate diplomas in Industrial health. This state of non-involvement of medical colleges is particularly significant, since all the medical colleges with a few exceptions are located in the large cities or towns where most of the post-independence industrial development has taken place.

) Development of linkages with existing health services :

Medical Educationists and Health Administrators have realised of late that Medical Colleges must begin to get closely involved with the existing systems of health care delivery in the country and help to create a referral services complex extending from the periphery all the way to the teaching hospital.[2] Not only will this move help to strengthen the existing health services by making available to it the specialist services that medical college departments can offer but will also help the medical college departments to reorient their curricula and make it relevant to the actual health needs of the country. This process will wean medical colleges away from the 'ivory towered' academic settings that they presently function in. In keeping with

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this philosophy, there is great scope for medical colleges to establish links with health services in industries/plantations either directly or through the ESI Scheme and whereever such services do not exist they can catalyse their development. These links can be of various types:

1. The Medical College through its department of Preventive and Social Medicine and or occupational health can form links with ESI Hospitals and dispensaries and attempt not only to strengthen their services but also make them more comprehensive (Fig I).

2. A Medical College could establish an occupational health unit which could link up with the health services of a factory and help to make it more comprehensive (Figure II). In factories which do not have a service it could help in its development.

3. A Medical College could help to establish a group occupational health service for a number of factories and this group service could be a separate unit if the factories are away from the Medical College, or it could be situated in the college if the factories are around the College (Figure III & IV).

4. A Medical College can through its existing rural and urban health centres offer an occupational health service to selected groups of working population or to neighbouring industrial units or factories (Figure V).

Figure I

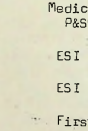

Figure II

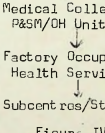

Figure III

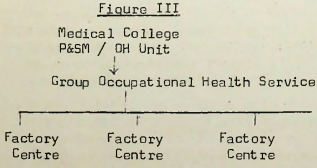

Figure IV

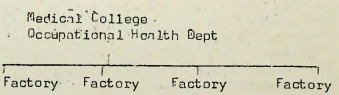

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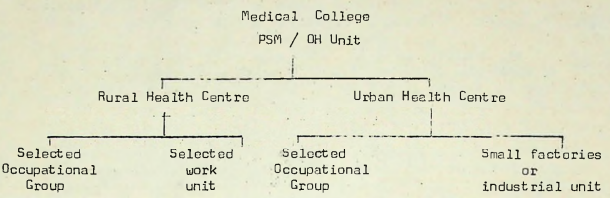
Figure V



Service Responsibilities -

c) Having developed different types of links described above, the medical colleges can offer the following services:

1. It can undertake short-term or long term occupational health surveys and epidemiological projects on specific occupational health problems. The interns, postgraduate students and faculties could be involved in such projects.

2. It can help to plan, organise and manage comprehensive occupational health services in factories or for specific occupational groups.

3. It can provide certain back-up facilities for doctors working in industrial/occupational health services:

   a) Specialist consultation
   b) Specialist Services
   c) Special laboratory investigations
   d) Special examinations
   e) Information and advisory service
   f) Library facilities
   g) Statistical analysis services

For all these services the average medical college can easily rely upon its existing staff and facilities of various departments. It may have to invest in a small industrial hygiene laboratory which should be capable of measuring the important parameters of the working environment e.g. temperature, humidity, noise, radiation, ventilation, lighting, gases and dusts.

d) Teaching responsibilities

The main contribution that a medical college can make in strengthening the existing occupational health services of the country is in the field of training of medical personnel especially doctors.

1. All medical graduates should be given a good basic course in the principles and practice of occupational health during their undergraduate programme.

2. Postings in well organised occupational health services should be introduced as an option in the internship training programme in public health.

3. For doctors interested in occupational health as a career, suitable diploma courses should be established in occupational medicine and or occupational hygiene.

4. For doctors and other medical personnal already working in factory health services, the college can provide continuing education or in service education through the organisation of short term adhoc courses and seminars.

It is very important to stress at this stage that the teaching and service responsibilities in occupational health taken up by a medical college, should develop side by side so that teaching is backed by knowledge gained in the field and service is based on sound academic principles. In this endeavour medical colleges must establish close links with the ESI Scheme, the local factory inspectorates and labour institutes and all other institutions in the country dealing with occupational health problems.

e) Occupational Health Centre : All medical colleges in the country have been involved in recent years with the development of rural and urban field practice areas and centres for providing students and interns training in the principles and practice of community health. Similarly for teaching occupational health, a medical college can help to develop a comprehensive occupational health centre in a factory and use this as a field practice and demonstration centre. The advantages of organising a health service within a relatively closed system such as a factory or plantation are manifold; i) Systems of record keeping are complete, efficient and comprehensive ii) Concept of total health care can more easily be practiced iii) Utilization of health services is greater iv) Dealing with management and union is simpler than with community leadership v) With management involvement preventive and promotive measures can be introduced and their effects studied.

f) Ross Institute Unit of Occupational Health, Bangalore

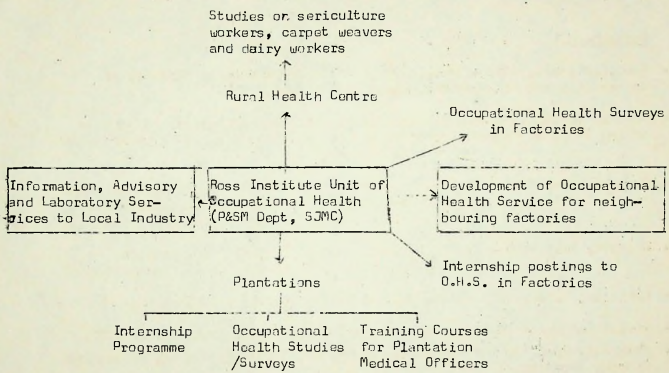
Most of the ideas given in this paper are based on the experiences of the Ross Institute Unit of Occupational Health which has been established in the Department of Preventive and Social Medicine, St.John's Medical College, Bangalore, in collaboration with the Ross Institute of Tropical Hygiene, London School of Hygiene and Tropical Medicine. The objectives of the Unit are:

1. To study the occupational health problems of workers in industry, plantations and also non-industrial occupations.

2. To create an awareness and interest in the medical profession in the principles and practice of occupational health.

3. To develop the field of occupational health in South India through teaching and research.

Over the last two years of its development many ideas are being experimented within the field and Figure VI attempts to summarise this.



SUMMARY

1. Rapid industrial development has added a new dimension to the public health problems in the country-occupational health hazards and environmental pollution.

2. Medical Colleges must begin to play increasing role in spreading the concepts of occupational health and developing comprehensive occupational health services.

3. Medical Colleges should establish links with existing occupational health services. It should undertake surveys, plan services and provide back-up services for industrial medical officers.

4. Medical colleges should strengthen undergraduates teaching in occupational health organise suitable internship, training programmes, establish diplomas and carry on in service training through adhoc courses and seminars.

ACKNOWLEDGEMENTS

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Dr.Donald Mackay of Ross Institute, London, in the development of the Occupational Health Unit in Bangalore and in the various experimental activities carried out since its establishment in August 1974.

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THE IMPACT OF INDUSTRIAL GROWTH ON HEALTH IN SOUTH-EAST ASIA

by

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INTRODUCTION

By "South-east Asia" is usually meant the area comprising East Indies and the Indo-chinese peninsula of continental Asia. The term is usually taken to include the countries of Indonesia, Philippines, Singapore, Malaysia, Brunei, Burma, Thailand, Cambodia, Laos and Vietnam. It contains a population of approximately 250 million people. From the sixteenth to the first half of the twentieth century, all the constituent parts of the region were colonies of Western powers, with the single exception of Thailand. By 1963, however, all parts of South-east Asia had gained their independence except Portuguese Timor. Brunei remained a British Protectorate.

The climate is predominantly tropical, with an annual rainfall generally above 40 inches (1,000 mm.). Rice and maize are the main staple foods. The region is very rich in natural resources, and produces rubber, rice, sugar, teak, tin, pepper, bauxite, petroleum, palm oil, coconut oil, etc.

The industrial development in the region, as a whole, is still at an early stage. However, it varies greatly, ranging from Singapore, which is quite highly industrialized, with over 4,000 factories, to Laos, which has virtually no major industry.

No matter at what stage of industrial development, all the governments in the region do subscribe to a belief that industrialization is a

pre-requisite to progress and prosperity. As has been aptly expressed, though it was in the context of South Asia and not South-east Asia,

"It is reasonable that a discussion of economic development policies in South Asia should begin with the ideology of industrialization. A clamor for industrialization is notable in all countries of the region. When the intellectually elite say their countries are underdeveloped, they mean, in the first instance, that they have too little industry. Thus spokesmen for the South Asian Countries frequently use the terms 'pre-industrial' or 'under-industrialized' as synonyms for 'poor' or 'undeveloped'" (Myrdal 1968).

Mention of the commencement or the intensification of industrialization is commonly made in national development plans. The Second Five-Year Plan of the Federation of Malaya (now Malaysia) is a case in point. We quote,

"For the future, the importance of manufacturing to the Federation's long-run development and economic diversification can hardly be over-emphasized" (Fed. of Malaya 1963).

The declared purpose of industrialization is usually to create more financial resources in order to improve the standards of living for the people. More jobs would be available. More money could be spent on community facilities such as schools, health clinics, and hospitals. However, economic reasons may sometimes take second place to emotional or political ones:

"Whether or not there are sound economic reasons for the establishment of secondary industries in a primary producer country, the will and desire to establish such industries usually increases as the country progresses educationally and in political stature. The fact that home produced raw materials are exported, often thousands of miles, only to be reimported in a manufactured, or processed, and more expensive, form is

sufficient in itself to impel attempts to get up similar manufacturing industries within the basic producer country" (Fed. of Malaya 1957).

Most of the political leaders in South-east Asia and the social and other scientists who advise them fully realise that development does not consist merely of industrial growth. Rather, "development may be seen as a process of improving the capability of a nation's institutions and value system to meet increasing and different demands, whether they are social, political, or economic" (Yeh 1971a).

They are also cognizant of the fact that industrialization and the concomitant process of urbanization may result in undesirable by-products as well as the desired products of more affluence and social amenities.

"With rapid industrialization, urbanization and physical re-development, new dimensions in health policy have to do with the Government's concern for a more integrated approach towards the improvement of the total ecological environment and therefore include attention and new legislation with respect to industrial health, water and air pollution, and other measures to promote mass participation in raising public health standards" (Yeh 1971b).

THE COST IN HUMAN SUFFERING

A common problem is to decide what is the acceptable price, in terms of human suffering, which should be paid for development. Another problem is the difficulty of visualizing things which have not yet occurred and persuading the decision-making bodies to divert funds from the primary purpose of economic expansion to measures against pollution, adverse social repercussions and ill-health which may result.

The social scientist may be "a voice in the wilderness" when he argues that individual human beings are more precious than money or machines. The industrialist does not own his workers, but he does his machines. In

relatively socially-backward societies such as many of the South-east Asian countries, there is usually an over-supply of unskilled labour. The proprietor or manager usually gets off quite lightly financially if workers in his factory are killed or injured.

Therefore the message, to be effective, has often to be directed towards their pecuniary interests rather than towards their social conscience:

"It is agreed that the primary objective of industry is to make money, not to do charity. However, let it be remembered that men are the most important resources of any factory. Any industrialist would be considered a fool if he does not keep his machines properly lubricated or regularly maintained, but only send them for repairs whenever they break down. Yet some industrialists permit managers, supervisors and workmen to suffer from ill-health ... which must have telling, adverse economic effects in terms of wrong decisions, poor morale and lowered productivity" (Phoon 1971).

On the other hand, the community as a whole, may be more affected by stories of human pathos rather than cold sets of facts and figures usually presented by experts in Occupational Medicine and Safety. Who will not be moved by this true anecdote, describing a common yet very tragic occurrence?

I once was in a factory and I met a little girl with three fingers cut off. This happened from an accident from a circulating saw. Then I thought of her plight and I looked at the whole condition from the beginning. This girl was warded in the hospital for about three weeks, was treated by doctors, was given medicine, then was given sickness absence, of course, during the whole period of time and at the end she was given compensation and then I asked the manager of the plant, "How much does it cost to have a guard on this circulating saw?"... I found

it was one-hundredth of the cost of the disabilities that had happened to this poor girl" (El Batawi 1968).

Unfortunately, we are not told who paid for the hospital fees. Probably the state, not the employer. Nor are we told who paid for the compensation. Probably the insurance company, not the employer directly. The employer perhaps paid only the usual insurance premium, regardless of whether the injury had occurred or not. So he probably still saved money (his own) by not putting the guard!

Sometimes the occupational accidents and diseases which occur are caused by the lack of technical education or orientation on the part of the workers pouring into the thousands of factories newly set-up in recent years:

"The rural education of the migrating youth frequently does not provide him with the skill needed in urban areas. Although technical education is more easily available in cities, the frequent preference for white-collar jobs has resulted in only rudimentary provision of vocational and technical education, even in cities. Consequently, the urban youth is also ill-prepared for industrial employment ... Even when the migrating youth is not exploited in factory employment, he has to adjust to the fact of work dictated by the unfamiliar machine. He is often puzzled by the piece-meal nature of his work and disturbed by the impersonality of industrial employment" (World Assembly of Youth 1967).

As so many new factories spring up, there is a great shortage of skilled managers and supervisors who can provide proper training and supervision for the raw recruits. This, in turn, leads to more mishaps in industry.

We do not need to apologize for concentrating our attention on

the worker, as he is the one exposed to the greatest concentrations of noxious substances produced by industries as well as to the physical hazards of his working environment. A recent seminar held in South-east Asia stresses this:

"The majority of developing countries are today determined to start with industrialization and to upgrade their overall economy as rapidly as possible with a view to securing a higher standard of living. A rapid industrialization, however, produces far-reaching changes in society and affects practically all of its strata. A number of developing countries are now passing through such a transition period and are having to adjust themselves to the requirements of modern society ...

"Radical changes in the way of living ... a completely changed type of housing and social environment, and new working methods often lead to a deterioration of mental and physical health. The health problems resulting from the introduction of new industrial processes, and from urbanisation and mechanization, are complex, in this context. Of particular importance, because of its contribution to the economic progress of any nation, is the health of the worker who is exposed not only to environmental and other community health hazards but also to a variety of physical and chemical hazards in his work environment" (WHO 1971a).

THE EFFECTS OF INDUSTRIALIZATION ON THE COMMUNITY

I shall not go into a detailed discussion of the ill-effects of industrialization on the general community. In South-east Asia, as perhaps the rest of the world, it is extremely difficult to separate the factors of urbanization and the radical changes affecting traditional religions, culture and customs from the factor of industrialization in the causation of the dramatic transformation of most parts of the region during recent years. It is also, perhaps, true to say that we cannot fully quantify all the ill-

effects directly resulting from urbanization. As stated in a book devoted to the subject,

"In the large cities ... it is not the quantitative aspects of public health problems that are predominant. The macro-hazards of epidemics have given place to a complex of such micro-hazards as air and water pollution and other unsolved issues of sanitation. These, however, are not the only factors of urbanization induced damages to health. Others, as for instance, urban noise, the increased risk of exposure to carcinogenic substances, or the stressors of city life are all noxious effects endangering the health of town dwellers. In comparison with the mass destruction caused by epidemics, the micro-hazards seem to be of minor importance; still, they are by far not negligible if their chronic, often accumulative, effect is considered" (Bakacs 1972).

The inevitable rural-urban migration has led to the equally inevitable problems of overcrowding and the development of "shanty towns" with their poor sanitation, object poverty and malnutrition. Some of the capital cities of South-east Asia have "shanty towns" accommodating a quarter or more of their populations.

"The expanding industrialisation in traditional urban centres has further exerted a special "pull" towards movement of people to cities ... the result has been industrial expansion in already overcrowded urban centres and the further migration of potential labour from rural to urban areas in numbers surpassing employment opportunities, thus creating two serious problems of overcrowding and unemployment" (Jegasothy 1967).

The problem of rural-urban migration is universally recognized but effective solutions are not forthcoming. Proposed solutions are many, as exemplified by the following:

"How do we solve this problem? Can we say that let us stop industrialisation and let us go back to the villages? We must industrialize

and do it rapidly. The only solution, as I see it, is to industrialize the villages instead of the cities. Take the industries into the villages rather than having the whole of village after village migrate into industrial complexes in the cities" (Reddy 1967).

In Malaysia an attempt is being made to stem the tide of rural-urban migration by paying more attention to the development of agriculture, so that both jobs and productivity could be increased. Moreover, agricultural development is viewed as a necessary adjunct to industrial growth.

"In a very fundamental sense agricultural progress is a requirement for industrial growth ... Planners still have much to learn about agriculture's role in economic development. But they are now in general agreement on the need to give high priority to both agriculture and industrial development in national plans" (Robless 1963).

THE DIFFICULTIES OF EXTRAPOLATION FROM EXPERIENCES OF OTHER REGIONS

We cannot merely extrapolate the experiences of Community Medicine or Occupational Health, gained in the developed countries of the West, to another area of the world such as South-east Asia. The climatic conditions, in the first instance, are very different. This is sometimes not sufficiently realised by experts either domiciled in the region or visiting it:

"The basic hygienic evaluation of the impact of air-borne concentrations of chemicals in industrial atmospheres refers to temperate climatic conditions. Gross deviations of physical pressure, ultraviolet and ionizing radiation in the atmosphere of work sites may result in adverse effects from these chemicals even if their concentration is permissible according to the list of Threshold Limit Values ...

"Human volunteers exposed to 2% parathion dust at different ambient temperatures have shown an increased absorption of para-nitro-phenol, following their exposure to 28° - 46°C" (Wassermann 1968).

Not only is the physical environment in South-east Asia different from that in the West, but there are also inherent differences in the population which may produce dissimilar reactions to toxic substances or physical stresses. For instance, there are large numbers of people in South-east Asia who are born with deficiency of the enzyme, 6-glucose-phosphate dehydrogenase. Since the first clinical case of this enzyme deficiency in Singapore was described in 1959 (Vella and Phoon 1959), it has been discovered that it is the commonest cause of kernicterus (severe jaundice with affection of the brain in neonatal children) in Singapore and that is quite a common cause of haemolytic anaemia, precipitated by chemicals and other substances.

OCCUPATIONAL HEALTH PROBLEMS IN SOUTH-EAST ASIA

We will now describe some of the occupational health problems which exist in South-east Asian countries. It must be stressed that the knowledge about these problems is very scanty due to inadequate machinery for the collection, processing and analysis of data in most parts of the region.

South Vietnam

By 1971, industries in Vietnam had been developing for twenty years. There were 22,550 industrial enterprises which employed approximately 240,000 workers. Industries included agriculture, forestry, mining, construction and public utilities.

There are elaborate occupational health laws, including the provision for the obligatory employment of a nurse for industries employing less than 100 workers, and provision for nurses and part-time physicians for industries employing more than 100 workers; and also yearly medical examinations for all workers (Nguyen 1972). Unfortunately, however, these provisions are not usually observed. This sad state of affairs is

by no means unique to South Vietnam. Some politicians seem to tend to "solve" the problems of industrialization by merely "wishing them away" by passing elaborate sets of legislation without providing for adequate enforcement.

Thailand

320 cases of pesticide poisoning occurred in Rajburi Province in 5 years from 1966-1970, including 24 fatalities. The province in 1971 contained a population of 3,789 comprising actual users and exposed persons and was largely agricultural (Hongpanich et al. 1972).

30 cases of lead poisoning were described in small factories, making or handling lead print-type or smelting and refining lead.

In 1969 lead poisoning cases occurred in children from families who manufactured sugar from coconuts, during the process of which they used the cases of worn-out storage batteries as fuel (Trishnananda and Attanatho 1971).

In 1965 the occurrence of manganese poisoning in a dry cell battery plant was reported. There were 44 cases of varying grades of paralysis in employees working in the mixing and filling operation of the factory (WHO 1971b).

Indonesia

A survey among miners showed that 1/25 had silicosis. Among carders in the textile industry, an investigation on 20 revealed two cases of bronchospasm associated with their job, one case of repeated bronchitis and two cases of chronic bronchitis. Occupational deaths from pesticide poisoning have also occurred. The nutritional status of workers was found to be often unfavourable. "The prevalence rates of such diseases, however, appear to be relatively low due to the lack of reports, insufficient orientation of the physician to make the diagnosis, a high labour turnover ..." (Sumamur 1972).

"The most prevalent occupational diseases are pneumoconiosis and

dermatoses. Occupational metal diseases, and some other industrial poisonings, have been observed" (WHO 1971c).

The Philippines

Silicosis, lead poisoning, and intoxication from pesticides have been described. Cases of byssinosis have also occurred.*

Burma

Apart from industries related to agriculture, the most important industries were probably those related to oil refining and the wearing of cotton and silk fabrics. We do not possess information on occupational diseases in that country.

Laos

There are small industries manufacturing cigarettes, matches, soft drinks, rubber sandals and sawmills (United Nations 1966). We do not possess information on occupational diseases in that country.

Cambodia

Some agricultural and village industries exist. We do not possess information on occupational diseases in that country.

Malaysia

In a population of nine million in the Peninsular part of Malaysia, there is a total work force of about 3.2 million. Almost 50% of workers are engaged in agriculture, more than 9% in manufacturing industries, 3.5% in the construction industry, [illegible] 3.7% in transport, storage and communication, and 2.2% in mining. Although there is a wide range of legislation, certain sections of the working population are still unprotected. Enforcement problems exist (WHO 1971d).

* Personal communication

Cases of poisoning from pesticides, lead poisoning, industrial accidents in the construction and other industries, and occupational dermatitis in the rubber and chemical industries, have been described.*

A SINGAPORE CASE STUDY

Singapore will be discussed in greater depth, partly because the author has better acquaintance with its problems and partly because it is the most advanced industrially of all the countries in South-east Asia. At first sight Singapore does not seem to have many things in common with other countries in the region. Its land area is, by far, the smallest 584.3 sq. kilometres or 225.6 sq. miles). Its population is only approximately 2,200,000, people of Chinese origin accounting for 76 per cent. In fact, many of the industrialized areas in the other South-east Asian countries share the problems of Singapore. Moreover, at the rapid tempo of development prevailing in the region, what exists in Singapore today will probably exist in the neighbouring countries within a decade.

There is no doubt that industrialization has conferred immense material benefits on the people of Singapore. Partly because of industrialization, the average income per capita in Singapore is over U.S.$1,300 per annum, the second highest in Asia. The contribution to the national economy by industry is also rapidly increasing.

"Over the last decade, the manufacturing sector has grown considerably, whether measured in terms of output, value added or employment ... The manufacturing sector's contribution to GPD at factor Cost has risen from 9 per cent in 1960 to 17 per cent in 1969" (Huan 1971).

* Personal communication

It is interesting to recall that when the programme of rapid industrialization was commenced about fourteen years ago, that "The unemployment problem appears to have overshadowed all other problems in Singapore and has become almost the exclusive reason for industrialization" (Goh 1969). The number of jobs created by industrialization has meant that the unemployment problem is no longer the only or even the most important factor, as there is almost full employment and there are approximately 60,000 immigrant workers in Singapore now. The immigrant workers are mostly from Malaysia.

Very successful public housing programmes and the provision of better community health facilities in the form of more doctors, nurses, clinics, and hospitals have been made possible from the fruits of the industrialization programme and have made Singapore one of the cleanest and healthiest countries in Asia.

However, Singapore has not escaped the penalties of industrialization.

There are over 4,000 factories, employing an estimated total of 130,000 workers. The most urgent health problem faced by factories is the increasing trend of industrial accidents leading to deaths and injuries, as shown by Table I.

The increasing trend is disproportionate to the increase of numbers of workers and factories over the same period.

Table II shows the number of accidents reported for 1972 by industry and number of factories where the total accidents exceeded 40. Figures in brackets indicate fatalities.

Occupational diseases have also occurred.

It is not possible to give an exhaustive account. Some examples, perhaps, would suffice.

There are some 23 granite quarries employing about 1,500 workers in Singapore ... In a 1965 survey, out of 1,180 workers X-Rayed, 9% had

TABLE 1: INDUSTRIAL ACCIDENTS IN SINGAPORE

Year	No. of accidents reported	No. fatal	No. permanently disabled
1968	8,147	109	703
1969	8,714	132	731
1970	9,682	159	886
1971	10,197	147	1,072
1972	10,675	136	1,474

TABLE 2: INDUSTRIAL ACCIDENTS IN SINGAPORE IN DIFFERENT INDUSTRIES

Industry	No. of Accidents (Incl. fatalities)	No. of Factories
1. Building and repairing of ships, tankers and other ocean-going vessels	645(3)	13
2. Manufacturing of plywood and veneer	319(2)	8
3. General building construction	295(22)	544
4. Civil engineering construction	117(3)	91
5. Stone Quarrying	103(2)	35
6. General engineering works	73(1)	276
7. Manufacture and repair of industrial and agricultural machinery (including engines and tubines)	68(1)	78
8. Spinning, weaving, printing and finishing of yarns and fabrics	66	14
9. Iron and steel rolling mills	62(1)	2
10. Building and repairing of barges, lighters and boats	53	18

definite silicosis and 24% had suspected siliconis. A similar survey, concluded in 1971, found that 15% had definite silicosis and 17% suspected silicosis, out of 1,230 workers X-Rayed. The other industries which have a silica dust exposure are rubber powder factories, iron foundries, pottery works, sand blasting operations and tombstone-making (Phoon (1974).

Interesting cases dealt with by the Industrial Health Unit in 1972 included an outbreak of dermatitis in an electronic factory due to a liquid soap which predisposed to photo-sensitivity and an outbreak of hysterical attacks among female workers of a plastic toy factory. This was the first "epidemic" of hysteria ever reported in factory workers in Singapore (Industrial Health Unit 1972).

Other occupational health problems in Singapore which have been reported include lead poisoning, occupational dermatitis, decompression illness, leptospirosis, heat stress and psychological problems due to maladjustment to jobs (Phoon (1973) and rockfish stings in fishermen (Phoon and Alfred 1965).

In a survey of 33 small factories, it was found that only 12 had satisfactory standards of sanitation and safety. These small factories, have very scanty financial resources, a high labour turnover, and often very limited management and training skill - all factors which predispose to high rates of accidents (Phoon et al 1974).

The widespread practice by large firms of contracting out dirty or dangerous work is also making enforcement of health and safety legislation more difficult. Employers sometimes inform Factory Inspectors that the hazards of lead-poisoning or silicosis "no longer exist" in their factories because they have handed over the processes, involving such hazards, to contractors!

The situation, described below, exists in Singapore as it does in Japan:

"One of the major problems of industrial health in today's Japan is the hygiene problems of the "inner contract workers" who, though working within a certain enterprise, have no direct employment contracts with the enterprise itself ... It has long been pointed out that the manufacturing processes for which the inner subcontract workers are responsible are often dangerous and unhealthy ones with a high incidence rate of labour accidents and occupational hazards" (internat. Congr. Occup. Health 1969).

In 1969, the author listed some of the factors which impede the progress of occupational health in a developing country. The factors were:-

1. Economic development usually get most of the money available. Occupational health measures do not usually receive sufficient government funds, as it is argued that they can wait until the industries are fully launched.

2. The lack of sophistication by workers sometimes lead them to demand more money to carry out dangerous jobs or increased compensation for permanent disability rather than to demand that their working environment should be rendered safe.

3. Employers and workers may agree about the desirability of using safety equipment, but disagree as to who should provide it.

4. The characteristically hot and humid climate makes the regular usage of personal protective equipment very uncomfortable.

5. The polygot nature of many developing countries sometimes lead to problems of communication between supervisors and workers, and these in turn may predispose to accidents.

6. The lack of uniformity in health and safety standards in industries established by multi-national companies in the developed countries

sometimes lead to confusion in the provision of health and safety measures (Phoon 1969).

In the opinion of the author, these factors have contributed to the incidence of accidents and diseases in the industries in Singapore.

The ill-effects of industrialization on the general community are more difficult to determine. During the last few years, there has been more congestion of traffic, more overcrowding, more pollution and increase in the tempo of living. During construction of factories, there have been occasions when mosquito breeding has increased due to the formation of stagnant water. In 1973, there were over 1,000 cases of Dengue haemorrhagic fever in Singapore. Some of them could be attributed to an increase in the population of Aedes aegypti mosquitoes in construction sites. Psychiatrists have claimed that there is more mental ill-health in the community. In the report of a Committee on Crime and Delinquency, which was set up by the Government, it was stated that "crime among the young had increased at an alarming rate over a five-year period from 1968 ... the crimes by juveniles against property with violence rose from 30 in 1968 to 119 in 1972" (Straits Times 1974). Suicides do not seem to have increased, though the mode of suicide has changed. Jumping from the upper storeys of high-rise apartments has become the most popular method of committing suicide. Could any or all of these changes be justifiably attributed to industrialization? If so, to what extent? If we ask ourselves the question, whether industrialization has made people happier or not, we also run into the difficulty of defining and quantifying what we mean by "happiness". We lack a generally acceptable "happiness" index or sufficiently sensitive indicators of social advancement. Moreover, what may be accepted to be indicators of progress or prosperity by some may be construed as pointers towards a sick society by others.

CONCLUSION

Perhaps the title "conclusion" is a misnomer, because the whole of my paper is based on the premise that while we can see momentous changes taking place in South-east Asia and the direct effects of industrialization upon the health of workers, we are not yet in a position to evaluate quantitatively either the benefit or harm of industrialization or to balance the one against the other.

We maintain, nonetheless, that South-east Asia offers an unique opportunity to study the social and health effects of industrialization, even though we may not know what they are exactly. Some of the changes which occurred during the hundred and fifty years of the Industrial Revolution in the West are being re-enacted over decades in South-east Asia. SEAMEO (South East Asia Ministers of Education Organization) has set up a Tropical Medicine and Public Health programme, in an attempt to pool the scanty training and research resources in the region. Singapore has been selected as its centre for the study of Urban Health and Occupational Medicine.

Hopefully, in the next few years or so, we may be able to gather more knowledge and arrive at more concrete conclusions about the impact of industrial growth on health in South-east Asia. It may be, of course, that we shall never have the whole picture, but it is surely a worthwhile goal to advance the frontiers of knowledge about this most important subject. We can at least take consolation from the works of J. Bowlby, "It must be remembered that evidence is never complete, that knowledge of truth is always partial and that to seek certainty is to await eternity."

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OCCUPATIONAL HEALTH IN THE TROPICS

(A paper presented at the Symposium on Geographical Conditions and Occupational Health at the XVIII International Congress on Occupational Health, Brighton England, 14-19 September 1975)

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OCCUPATIONAL HEALTH IN THE TROPICS

by Professor W. O. PHOON

"You might be able to get two people to sleep in the same bed, but you cannot get them to dream the same dream." Old Chinese proverb.

It is indeed a great and undeserved privilege for me to be the opening speaker at this very distinguished international gathering. May I claim your kind indulgence for what will be, perhaps, merely a curtain-raiser (in the parlance theatrical circles) or a supporting bout (in the language of pugilistic contests) to the long series of erudite papers which will follow mine. For the purposes of my discussion, I will adhere to the usual definition of "tropics", as meaning lands lying between 23°28' north and south of the equator, although I do hope that geographical pundits will forgive me if I inadvertently stray from these frontiers in my presentation. For practical purposes, the tropical lands all fall into the category of developing countries, though some are "more developing" than others!

In a sense, Occupational Health in the tropics is not new, if by it is meant "the health of the gainfully employed." Even before the advent of the white man in the visage of traders, empire builders or missionaries, witch-doctors, shamans and practitioners of the various native systems of medicine were looking after the health of the gainfully-employed, be they warriors in the king's army or peasants in the field. With the establishment of Western colonies, mines and plantations were developed, either by the colonial governments themselves or by multi-national companies. As the Western-type of health care was virtually non-existent, certainly in the rural areas where mines and plantations usually are, it was deemed necessary to operate comprehensive health

services for both workers and their families.(1) Many of such services have existed to this day. However, their emphasis on occupational health problems varied a great deal. Sometimes the services were predominantly curative. Sometimes they included a large preventive element as well, mainly in general public health. Until recently, very few services paid sufficient attention to the special risks of different forms of work to the employee, and the possible health consequences of such risks.

Let us now examine the thesis of whether there are in fact significant differences between Occupational Health, as should be practised in the tropics, and as practised in the non-tropical countries, which are mostly developed ones. Let us also evaluate whether these differences are great enough to merit the establishment of a new discipline or sub-discipline called, perhaps, Tropical Occupational Health. After all, there is already a discipline in its own right by the name of Tropical Medicine or Tropical Health, with chairs and institutes situated, strangely enough, mainly in non-tropical countries! There are also centres, albeit fewer, specializing in "Tropical Paediatrics" or "Tropical Child Health" awarding degrees for the subject, and other institutions with emphasis on what they call "Tropical Public Health".

THE IMPLICATIONS OF THE TROPICAL CLIMATE ON OCCUPATIONAL HEALTH

An obvious difference is that of climate, about which so much has been studied and written that I need only to discuss it briefly. There are certainly many occupational health problems arising from or predisposed to by the tropical climate. Heat problems tend to occur more frequently, though I am somewhat surprised by their relative lack of frequency. I have seen several cases of heat cramps and heat syncope among

European workers in the tropics, but very few among the indigenous population in such countries.

Dermatological conditions, which are related to or aggravated by excessive sweating, tend to be more often seen, e.g. general pruritus and miliaria rubra. Severe forms of these conditions, of course, may interfere with the performance of the duties or the health of the workers.

The hot, humid climate may also make it difficult to persuade workers to use personal protection, e.g. respirators, aprons, etc. "There are several reasons why the hazards associated with field application of insecticides are difficult to control in the tropics, namely, Climate:- Protective clothing may be objectionable to workers in hot humid countries. In addition, high temperatures may increase the speed of skin absorption of many chemicals. This is dangerous, as often washing facilities may not be adequate, in such circumstances. Eating immediately following spraying operations may be specially hazardous."(2)

In Occupational Hygiene, there are many problems affecting instruments and measurements with them. Rust and moulds are ever-present dangers, and the more delicate instruments require dehumidifiers and air-conditioners as well as frequent inspection, as a result. The high humidity of the atmosphere in many tropical countries may also affect the results of some air-sampling instruments.

In Occupational Toxicology, our eminent chairman, Professor Marcus Wassermann, has most ably summarized the differences in the tropics,

"The basic hygienic evaluation of the impact of air-borne concentrations of chemicals in industrial atmospheres refers to temperate climatic conditions. Gross deviations of physical pressure, ultraviolet and ionizing radiations in the atmosphere of work sites may result in adverse effects from these chemicals even if their concentration is

permissible according to the list of Threshold Limit Values .....

"Pharmocological studies have drawn our attention to the fact that during exposure to high temperatures, there is an increase in the susceptibility and the rate of reaction to most drugs. Experimental studies have reported the increased susceptibility to chemicals like DNOC, parathion, cadmium, lead, benzene, carbon tetrachloride, benzene vapours, gassing , carbon monoxide, hydrochloric acid, vapours and nitrogen oxides ....

"Increased respiratory rate produced by a hot climate, a modified rate of absorption, distribution and detoxification of the chemicals and an altered level of the normal body functions due to the work at high temperatures, are all factors which have to be considered in recommending any implementation of hygienic work conditions."(3)

There are, nevertheless, some advantages accruing from working and living in the tropics, insofar as Occupational Health is concerned.

As there is no need to provide insulation against cold weather, the factories tend to be constructed with open doors and high ceilings, unless air-conditioning is installed. There is therefore usually good general-ventilation. This is probably a reason why air-borne contaminants, such as inorganic lead dust, sometimes are not as high as expected in storage battery factories, which have installed few or no environmental health measures, such as exhaust ventilation.

Moreover, without being derogatory to the people from the developed countries, it is probably generally true that workers in tropical countries bathe and wash themselves more often than their counterparts in the colder, developed countries.

This is mainly because of the great bodily discomfort which

arises from the heat, humidity and sweat in such climates.

From personal observation, it seems to me that Occupational Dermatosis (or Occupational Dermatitis) is less frequent in tropical workers than those in the West handling the same chemicals engaged in the same processes. This could be due to frequent bathing which should at least reduce the amount of dermatitic agents in contact with the skin. This has been postulated before by many other authors.(4) I am aware that there are other possible explanations, such as the increased skin thickness which occurs in coloured people.

There are somewhat different patterns of Sickness Absenteeism in tropical countries. The absence of winter means that there is no seasonal upsurge of respiratory illnesses, as there is often in the temperate region. The climatic conditions in the tropics do not favour temperature inversion and the development of smogs. It must be admitted, however, that tropical countries have not yet reached the stage of such intense industrial activity or concentration of motorised vehicles and the gross atmospheric pollution resultant therefrom as those cities which have suffered from severe smog episodes. As we know, smogs produce an increase in deaths and disability from cardiac and respiratory diseases.

I am not certain whether the incidence of rheumatism in the tropics is different. In colder countries we do know that the incidence of rheumatic disorders is very high. "Diseases of connective tissue are responsible for much temporary or permanent disablement. In the year ended June 1967, just over one million spells of incapacity among the insured population in Britain were due to 'rheumatic complaints' and caused a loss of productivity of £190 million. Time lost from work amounted to 35.19 million days. 'Rheumatic complaints' were second only to accidents as regards the number of people affected and second only

to bronchitis for the number of days lost."[5] In temperate countries, there is no question that chronic rheumatic diseases account for a significant amount of sickness absenteeism, especially among the older workers. My own impression is that such diseases are less frequent in the tropics.

THE DIFFERENT GENETIC INHERITANCE AND PHYSIQUE OF TROPICAL WORKERS

The workers in tropical climes are also endowed with different genetic inheritance and physical constitution. Admittedly, there are probably as large differences among themselves as from their fellows in the non-tropical world. In general, however, they are of smaller size and more slender build. This has various Occupational Health implications. In terms of Applied Physiology, there are differences in heat metabolism due to a comparatively greater skin surface for the same weight.

Ergonomics

It is unfortunately true that most vehicles and machines are not designed for the anthropometric measurements of the indigenous worker in most tropical areas. The inappropriate indigenous location of levers, gears and control panels are sometimes the cause for bodily or mental fatigue. For example, the size and design of the cabin of a heavy lorry were such that the relatively puny worker in a certain tropical country had to practise virtually both acrobatics and callisthenics to operate the vehicle properly. The dimensions and lay-out were, in fact, designed for his much larger and heavier counterpart in the West!

This ergonomic problem was commented upon several times in a recent seminar in the tropics:-

"We know that a great deal of research has already been carried out especially in the field of physiology of work and that a large number of methods of investigation has been perfected, making it possible to reach certain practical conclusions which are valid for all industries ... However, one cannot ignore the fact that most of this research has been conducted in highly industrialized countries and on populations having similar biotypic features, thus applied to individuals whose physiological, psychological and social adaptation to modern economic life has a long historical process of progressive adaptation."(6) and

"Caution must be exercised lest Ergonomic principles, valid in the West, are uncritically applied to developing countries." (7)

Enzyme deficiency

The genetic make-up in the populations of different tropical countries is too diverse for me to deal with in detail. I would like, however, to mention one genetic condition which is common and which may be important in Occupational Health. An inherited enzyme deficiency, of 6-glucose-phosphate dehydrogenase, has now been reported in several tropical countries, although it is also present in some countries of the temperate zone as well, such as those of the vicinity of the Mediterranean. In my country the first case was reported in 1959.(8) I am intrigued to discover whether other researchers have evaluated how often such an enzyme deficiency has led to haemolytic episodes in occupational circumstances.

Skin pigmentation in differential diagnosis

I have already referred to skin pigmentation in respect to occupational dermatitis. There is also the problem of differential

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diagnosis of Occupational Diseases, e.g. in heavy metal poisoning. For example, pigmentation on the gums and other parts of the oral cavity is very common in dark races, and should not be mistaken for the lead line of lead absorption.

Women and heavy work

In many countries of the tropics, there are many women engaged in heavy labour. The Chinese "Samsui" woman labourer with her red cap and blue attire is a famous example, carrying heavy loads at construction sites and in godowns. In my opinion, it is necessary to sort out the fiction from the truth about what occupations women should not do on health reasons. Many of the existing taboos are related more probably to body size than sex difference.

"First generation" workers and accidents

Some authorities in Accident Prevention have claimed that first-generation industrial workers are more prone to accidents than those with fathers who had been employees in industry. Apparently, some of the familiarity in dealing with machines "rubs off" from sire to son. I am not sure about the truth of this hypothesis, but the rates of occupational accidents are usually quite high in tropical countries with a satisfactory notification and record system of such accidents. It is difficult to extricate this "first generation" factor from the concomitant factor of poor education in the causation of accidents. The lack of literacy and sophistication, which is rampant in most tropical countries, may be a great impediment to proper instruction in operating and safety procedures. To be fair, however, it may be the lack of linguistic talent in the foreign "bwana" or "tuan" (employer) which may precipitate the

accident. There is sometimes a tendency on the part of some expatriate supervisors or employers to flatter themselves that they are masters of a local language whereas, in fact, they are "murdering" it. This may have disastrous consequences to Occupational Health or Safety.

Attitude towards authority

On the credit side of the "balance sheet", it is perhaps still true that the average worker in the tropics is still more respectful of authority than his counterpart in non-tropical areas. As a consequence, he may comply more readily with instructions necessary for good health or safety at work.

Religious, cultural and social factors

Religious, cultural and social traditions all influence Occupational Health practices. In the Muslim World, employees fast during the month-long "Ramadan" period, despite the fact that most of them are required to work as usual. They are forbidden by religion to eat or drink from sunrise to sunset. This has obvious implications concerning hydration in hot conditions and energy expenditure in heavy work.

Workers in the tropics also tend to be more superstitious. One electronics factory in Singapore almost closed down a short while ago because several girl employees thought they saw a ghost there.(9) Another company with which I was associated had to pay large sums of money to exorcise an evil spirit in the work-site. As the work-force was multi-racial, the company had to pay for three teams of exorcists, Chinese, Malay and Indian. I also remember another instance wherein the expatriate manager of a factory came to me in a panic, as some of his key workers were threatening to resign, as they claimed to have seen headless ghosts in their new quarters..

The Occupational Physician, Engineer or Nurse who scoffs at such beliefs and practices may find himself ineffective in his role, no matter what his own beliefs may be. He must have a thorough appreciation of the religious, cultural and social background of the people he serves so that he could communicate effectively and recommend the most effective health measures in a particular milieu.

THE DIFFERENCES IN ENVIRONMENT

More biological hazards, including infections

There are more biological hazards in the tropics than in the temperate zone. Some fungal infections, e.g. tinea versicolor, abound. Malaria alone accounts for far more deaths and ill-health in tropical workers than metal poisoning, pulmonary dust diseases and occupational cancers together. Tuberculosis and other infectious diseases are common causes of sickness absence. Epidemics of cholera, typhoid, dysentery and yellow fever, etc. have been known to devastate mines, lumber-camps and plantations and even lead to their shut-down. Parasitic infestation is often the real reason for the so-called "laziness" of tropical workers. It is not easy to be well-motivated, hard-working and intelligent when one has a haemoglobin value of seven g/100ml. blood due to hookworm infestation or a body temperature of 102°F. due to malaria or is thinking of a wife or child coughing blood as a result of pulmonary tuberculosis.

Housing in shift work

There are also vast differences in the inanimate environment. Shift work, for example, is a problem, because tropical workers tend to have large families and crowded accommodation. Many workers in industrializing tropical countries have had to give up lucrative jobs requiring

shift duties because they simply could not get enough sleep after a day's night's work. Moreover, the architecture of workmens' quarters in the tropics is primarily designed to provide satisfactory lighting and natural ventilation. Noise is not kept out very much, unlike the working class houses in the West where houses are designed to keep out the cold, and as a by-product, noise is also kept out to a certain extent.

Environmental health problems

In the tropics, the conditions in the factory are often radically different from those in the community from which the industrial worker comes. At work he may encounter wash-basins and flush toilets whereas at home he may be inured to wells and bore-hole latrines. He cannot be really blamed, therefore, if he fouls up modern devices he is unaccustomed to. It is part of the duties of the Occupational Physician or Nurse in the tropics, nonetheless, to give proper Health Education and to devise effective measures to prevent the spread of contagious diseases arising from such abuse.

DIFFERENCES IN OCCUPATION

The occupations of most workers in the tropics will be mainly agricultural within the foreseeable future. Undoubtedly there will be an increasing number of industrialized foci in the tropics, but I cannot envisage extensive industrialization in most tropical countries for at least one to two generations. Therefore Occupational Health in the tropics must lay sufficient emphasis on the problems of those engaged in agricultural, mining and other types of primary production. In the following quotation, we can equate "developing countries" with "tropical countries" quite legitimately:-

"The majority of the population in developing countries is employed in agriculture. The most important risk to which the agricultural workers are exposed in these countries is snakebites. In a study made on "Nigeria's experience in Occupational Health", G.O. Sofoluwe reports that in most plantations he visited, the most common accidents registered were snake bites."(10)

In the tropics, there are many trades and manufacturing processes which have either not existed or disappeared long ago from the temperate zone. The occupational hazards of these trades or processes are, as a consequence, not even mentioned in most Occupational Health textbooks, as they are "exotic" to the Western authors, though common place in their native setting.

Nature is still relatively rich and unspoilt in many parts of the tropics. Inroads are made, however, into the luxuriant jungles and bush by development projects such as the construction of irrigation dams, highways or airports. These projects are necessary to improve the economy of the countries concerned, but those practising Occupational Health must make sure that such schemes are accomplished with the minimum of suffering by the workers and the least disturbance of the ecological balance in the area.

A DIFFERENT TYPE OF OCCUPATIONAL HEALTH TEACHING SYLLABUS IS NEEDED IN THE TROPICS

I have already discussed what I think are the formidable and extensive differences between Occupational Health in the tropics and non-tropical areas. If we accept that these differences exist, it stands to reason that the training of Occupational Health personnel in the tropics should be quite different from that in other areas of the world.

Obviously, the fundamentals of the subject may be the same but, in my opinion, the syllabus in the tropics should have more emphasis on the following aspects:-

(a) Public Health. One Professor from an institution which conducts an Occupational Health Course and is located in a developed country recently observed, after visiting a tropical university, that "Public Health is totally irrelevant to Occupational Health", thereby (in my opinion) betraying his own total irrelevance to Occupational Health in the tropics! This is especially important, as there may be very few Public Health experts around. Family planning should be an important part of the syllabus.

(b) Infectious Diseases. It is impossible for Occupational Health personnel to protect the health of their work-force unless they know sufficiently about the common infectious diseases in the tropics.

(c) Clinical Medicine. In many areas of the tropics, it is easier to avoid the artificial dichotomy between Preventive and Curative Medicine, as prevails in many non-tropical countries. Therefore, the Occupational Physician must be trained in Clinical Medicine, as well as minor general and Orthopaedic surgery, elementary Ophthalmology, Dermatology, to an even greater extent than in non-tropical areas.

"Generally speaking, however, training in internal medicine and public health is essential as a background. Internal medicine is important since it emphasizes the principles of diagnosis, which is necessary if occupational diseases are to be recognized and differentiated from those on non-occupational origin. This must be a first step in any preventive programme. Public health training is important because it orients the physician to think in terms of group phenomena of health and disease."(11)

(d) Occupational Hygiene. This may seem a contradiction at first sight. It must be appreciated, however, that Occupational Hygienists are even more rare in the tropics than in the temperate countries. The Occupational Physician, and perhaps even the Safety Engineer or the Occupational Nurse, should have a sound working training in Occupational Hygiene, otherwise there may be nobody to monitor the hazards of the working environment. The emphasis of such training should be in fairly simple techniques using cheap, robust pieces of equipment which are readily available and do not require much maintenance.

(e) Nutrition. The relationships between proper nutrition to health and productivity should be taught. Dietary advice and supplements are often necessary for workers in the tropics, unlike the situation in other areas.

(f) Behavioural Science. The orientation should be towards those aspects of behavioural science which are pertinent to societies evolving from a tribal or peasant community into modern ones.

(g) "Occupational" rather than merely "Industrial" Health. As have been discussed above, industry may play only a minor role in the lives and economy of most tropical countries for some time to come. There should, therefore, be adequate emphasis on all aspects of Occupational Health rather than on mainly the industrial aspects, as is done in some centres in non-tropical countries.

"The health problems of workers in developing countries are more complex than those of industrialised nations because of the high prevalence of epidemic and endemic diseases in most areas of the tropics. Modern concepts of occupational health embrace all types of employment including mercantile and commercial enterprises, service trades, utilities, forestry and agriculture. The distinction between environmental,

occupational and industrial health is academic in the context of many tropical families where the husband may work in the factory while the wife and children cultivate a plot for food."(12)

THE LOCATION FOR SUCH A TEACHING PROGRAMME

Where should an Occupational Health course for the Tropics be taught? Let me quote the words of two distinguished authorities on the subject.

"It is wrong for us to assume that the teaching programmes planned for students from our countries will suit those from tropical countries...so often in our country, we bemuse those men and women from India and Africa with details of British industry and its health services...

"One of the most crucial long-term problems is where those who will have the care of occupational groups in the tropics should be taught. Ultimately, I believe that most of them should receive instruction in their own countries with only the exceptional person who may himself become a teacher going to foreign universities."(13)

"In my opinion there is need for greater regional co-operation, including the provision of training facilities, than hitherto within this part of the world. In the past those seeking postgraduate experience have gone to England or the United States. Should this still be the case? Are the best results obtained this way? Alternatively should we not have a closer look at what is available nearer home? With few exceptions what is needed is practical training, involving visits to many factories in which the student carries out, for example, solvent, or dust, estimations with the local occupational health specialist who is investigating implant or agricultural conditions which are currently the subject of complaint. There is no effective substitute for real situations."(14)

I myself think that there is still a place for centres in the developed world to train some Occupational Health personnel from tropical countries, but preferably the majority of the latter should be trained in the tropics. It is highly desirable that they should be trained in conditions similar to those they will practise in.

AN ATTEMPT AT A TEACHING PROGRAMME IN OCCUPATIONAL HEALTH FOR TROPICAL COUNTRIES

Permit me now to describe a new course in Occupational Health conducted by the University of Singapore. The course was established in 1973, with a class of four. In 1974, there were five and this year eight students. They came from Indonesia, Philippines, Thailand, Malaysia, Singapore, South Vietnam and Cambodia. As far as Singapore was concerned, there was a growing realisation and demand for Occupational Health. As far as the other countries in South-East Asia were concerned, there was also a similar need. It was felt by the South East Asia Ministers of Education Organization (SEAMEO) that commonsense dictated the pooling of scant resources and that it was far more economical and useful to train people of the region in the region.
The cost of sending one person to distant centres overseas was equivalent to the cost of training five or six persons in-situ. Besides, the training acquired overseas may not be very relevant to the needs of South-East Asia. In pursuit of this objective, the course in Singapore has been sponsored by and recognized by the Tropical Medicine (TROPMED) Division of SEAMEO as the official course in the subject for the countries of South East Asia, with a population of over 200 million people.(15) The course is entirely financed by Singapore itself, but the majority of the foreign students are awarded SEAMEO scholarships to attend. The course leads

to the degree of Master in Science (Occupational Medicine) instead of the Diploma in Industrial Health, as originally proposed. There have been considerable "teething" problems; but we are overcoming them gradually. Problems included the lack of teaching staff, equipment, relevant books, selection of students and the drawing up of a syllabus, designed especially for tropical countries. The syllabi of Occupational Health courses in developed countries were studied and modified considerably to suit our own requirements. By no means do we claim to have devised the perfect syllabus. We still require to modify it annually according to our experiences and the feed-back from the students which is obtained regularly. The details of the syllabus, entrance requirements and examinations are contained in Appendices A and B. They are based on our philosophy about the needs of Occupational Health in the tropics, as discussed in the earlier portion of this paper. We are very grateful to SEAMEO TROPMED, China Medical Board, WHO and other bodies for their valuable assistance and contributions in the form of consultants, equipment and books. To ensure proper standards, we are inviting international authorities to come to Singapore to serve as External Examiners each year.

TROPICAL OCCUPATIONAL HEALTH OR OCCUPATIONAL HEALTH IN THE TROPICS?

Should a new speciality of Tropical Occupational Health be created? On reflection, there seem to be many valid reasons for advocating such a step. Just as Tropical Medicine is part of Medicine, but a special part thereof, and just as the terms Tropical Paediatrics or Tropical Public Health have been invented to fulfil a need, it is logical to think of Tropical Occupational Health as a special segment of general

Occupational Health. However, I myself prefer to stress the underlying thread of unity running throughout the whole field of Occupational Health, rather than the diversity which makes the field at once so challenging and frustrating. We must realise, nevertheless, that Occupational Health is not a monolith but is more like a "coat of many colours". We should accept departures of teaching programmes designed to make the subject more meaningful to the Tropics, not as a schism but as a welcome extension of that discipline. "There is a risk of teachers from developing countries visiting centres in developed ones and coming back filled with zest to introduce disciplines merely because these disciplines are included in the curriculum of centres in the developed countries."(16) I would prefer to look on Occupational Health as applicable to both tropical and temperate zones, though the type of Occupational Health teaching may need to be different in each zone, or perhaps even from country to country. We are living on one earth, and recent developments on the international political and economic scenes have made it even more imperative for us to learn from and help each other. These words are as relevant concerning Occupational Medicine as General Medicine:-

"Temperate zone medicine certainly owes a great deal to tropical medicine. Indeed, despite their interesting differences, it is hard to separate tropical medicine from general medicine today...

"We have learned much from the tropics concerning the pathophysiology of disease..... We have much to learn there about the effects of climate on health and efficiency..."(17)

Such, surely, is the spirit which motivated the creation of the Committee on Occupational Geographical Pathology and which will undoubtedly prevail in our deliberations at this symposium today.

Let us hope that all Occupational Health specialists at this Seminar and this Congress, both from the temperate and tropical climes, may not only share the same bed but also dream the same dream - of making the working lives of countless men and women truly happy, healthy and productive.

SUMMARY

Tropical Medicine is generally acknowledged as a discipline in its own right. Could a case be made out for establishing Tropical Occupational Health on a similar basis?

This paper deals with the problems of Occupational Health in the tropics, particularly in South-east Asia. It is largely based on the experiences of the author and his colleagues. Examples are given to compare and contrast some striking differences between the prevalence and epidemiology of occupational diseases in the tropics and those in temperate countries. They include heat stress, the greater importance of biological hazards, the differences due to variation in genetic constitution and in levels of education and sophistication, and the preponderance of small-scale and traditional industries.

The study of such problems is complicated by the fact that industrial populations in tropical countries are usually small and have a large turnover. Record-linkage in most tropical countries is also poorly developed.

Since the practice requirements of Occupational Health in the tropical countries may differ greatly from those in the temperate ones (in which most of the Occupational Health institutes and training centres are located), it is contended that the training of occupational health

practitioners for the tropics should preferably be done in-situ. The traditional type of curriculum of Occupational Health training should be modified also to fit the different needs of tropical countries. There should be, moreover, a larger content of community health teaching, especially in subjects such as environment sanitation, microbiology, nutrition, and family planning.

Finally, the author describes a newly-designed course in Occupational Medicine at his centre, and discusses the successes and difficulties regarding staff training, teaching, curriculum development, student recruitment and field practice during the last two years.

ACKNOWLEDGEMENTS

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APPENDIX A

DEGREE OF MASTER OF SCIENCE

(OCCUPATIONAL MEDICINE)

(I) A candidate for the degree of Master of Science (Occupational Medicine) is required to pass an examination consisting of a written section, practical section, a clinical section and an oral section.

(II) In order to be admitted to the examination, a candidate must:-

(a) have held a medical qualification for at least three years;

and (b) have had one year of full-time experience in Occupational medicine and/or Public Health;

and (c) have satisfactorily completed the course leading to the degree of Master of Science (Occupational Medicine) provided that this does not precede (b) above.

(III) A candidate is required to submit a dissertation on a subject approved by the Head of the Department of Social Medicine and Public Health.

Form of Examination:

Written Examination - There shall be four papers.

Practical Examination - Practical Examinations in Occupational Hygiene and Clinical Laboratory tests with particular reference to their application to Occupational Medicine.

Clinical Examination - A clinical examination of patients with particular reference to problems of Occupational Medicine.

Oral Examination – An oral examination in any aspect of Occupational Medicine.

In the assessment of a candidate's merit, the Board of Examiners shall take into account the candidate's dissertation and practical work during the course.

All sections must be taken at one and the same examination.

(IV) The fee payable for admission or re-admission to the examination is $150. This sum is subject to alteration at any time.

Guide to the Examination:

(1) General Preventive Medicine

Public Health including Communicable and Parasitic Disease Control, Sanitation and Public Health Administration.

Epidemiology including epidemiology of non-communicable diseases and especially occupational disease.

Nutrition.

Biostatistics including Research Methodology and Evaluation Techniques. Social Sciences and Group Dynamics; including social conditions of the community; social effects of illness; social deviation. Behaviour in relation to health and disease; medical ethics in industry; the functions of management, trade unions, personnel and welfare services.

Health Education including methods of educating management and workers in the promotion and maintenance of health.

Family Planning.

(2) Occupational Health

History of Occupational Health

Work Physiology including physical factors of the work environment; general effects of work on health, ill-health

(4) Practical Instruction

Teaching will include-

(a) Sessions at Outpatient Clinics, Specialist Medical Units and Industrial Health Unit and other Units related to the study of injury and disease caused or adversely affected by occupation.

(b) Visits to factories, other workplaces, laboratories and research centres.

(c) Field studies of practical health problems in factories and other work sites.

(d) Practical work in a laboratory.

APPENDIX B

M.SC. COURSE

DISSERTATION

Regulations (XII):

Section 1: "The course for the Mastership of Science ..... shall comprise: .... (c) The preparation of a dissertation on a subject approved by the Head of the Department of Social Medicine and Public Health."

Section 3: "The dissertation shall be submitted not later than a date, in the last term of the academic year, to be decided by the Head of the Department of Social Medicine and Public Health."

Section 5(b): "... In the assessment of a candidate's merit, the Board of Examiners shall take into account the candidate's dissertation...."

The following notes relating to the Dissertation are issued for the guidance of M.Sc. Course candidates.

1. A suitable Subject for dissertation should fulfil the following criteria:

   (a) It should be in your field of special interest or experience. It may relate to a project in which you were personally associated.

   (b) It should be a subject on which you are in possession of adequate basic material or data to enable you to deal with it in a fairly detailed manner. If you are not already in possession, you should

be ensured of the ready availability and accessibility of such basic material or data.

(c) It should be sufficiently limited in its field or scope to enable you to pursue the matter fully and to arrive at some definite evaluation or conclusion within the limited time available for you to do so in the 1st and 2nd terms of the M.Sc. course.

(2) Having initially satisfied yourself that the subject of your choice fulfils the criteria above, you are advised to set out a very brief outline of the proposed dissertation and to present this when submitting the subject of dissertation for approval by the Head of the Department of Social Medicine and Public Health.

(3) Each of you will be assigned a member of the Academic staff who will advise you on the subject matter and writing of the dissertation. You are, however, completely at liberty to consult any or all members of the academic staff, at any mutually convenient time(s), during the writing of the dissertation.

(4) The dissertation is a means both for training and for assessing the ability to pursue the study of a limited problem thoroughly, objectively and critically, and to write a lucid and well-disciplined report on such a study. The quality of a dissertation, therefore, does not depend on its length, but on the organization, manner of presentation, and soundness of its contents.

(5) Beware of the following which will impair the quality of a dissertation:

(a) 'Padding' with irrelevant material, however factual, interesting or detailed this may be.

(b) Making of loose or wild generalizations or statements which are unsubstantiated or unjustified by available evidence.

(c) Including only the 'pros' but omitting or forgetting the 'cons' when pursuing a line of argument or when making recommendations.

(d) Failure to describe adequately the source(s) or nature of basic material or data, or the methods by which they were obtained.

(e) Making deductions from data without considering the limitations imposed by their nature or quality.

6. Cognizance must be taken of other known sources of information (books, papers, reports, etc.) on the subject, and comparison, discussion, reference, quotation and acknowledgement must be adequately made where appropriate. For example:

(a) If some other person has previously reported on a study of similar nature, his findings and conclusions must be mentioned and, if relevant, compared with your own.

(b) If a method, technique, or procedure is used of which a detailed description is available elsewhere, reference must be made to the literature concerned.

(c) Where standard (conventional or otherwise) methods exist (say, in classification, measurement, statistical indices, etc.) these should be adhered to as far as possible, and adequate reasons must be given for any deviation therefrom.

(d) The sources of all information or opinion must be given, and the references must be properly cited in accordance with a system used by a respectable Medical Journal. A list of references and bibliography must be given at the end of your dissertation. (References must include, where appropriate, unpublished or personal communications in addition to published works.)

7. There is no set pattern of presentation for dissertations - different subjects require different treatment and presentation - but a useful axiom might well be: "Say what exactly you are going to do; do it;

and then say briefly what you have done." One point which needs to be stressed is that whatever material or data are presented, they must be carefully evaluated and discussed objectively.

8. Do not spend too much time making the first draft of your dissertation. Have this ready by the end of the first Term, so that the duration of the second term will be available for redrafting and improving on it, taking into consideration the queries and suggestions made by your adviser. Allow sufficient time for the dissertation to be type-written, proof-read, and bound, before the specified date for submitting of dissertations.

   The dissertation, when submitted, must be type-written (single face, double spacing) and bound in stiff covers, with the title and author clearly shown on the front cover.

9. Free periods on the programme are intended to be utilized for the preparation of the dissertation. Other available free periods resulting from cancellation of classes should also be so utilized.

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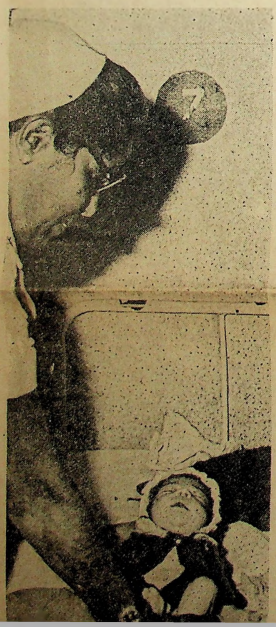
Leakages in benefits

Hospitals under the Employees State Insurance scheme were started to provide medical service to the workers. Many malpractices are prevalent, resulting in dissatisfaction to all the parties concerned — workers, doctors and employers.

IN June last, some coal mines in Andhra Pradesh, did not produce any coal as the workers were forced to go on strike by a section of the coalminers. It started because a doctor at the collieries hospital would not certify a worker as being unfit for duty. The worker is reported to have tried to assault the doctor and when the police whisked away the worker, a splinter group forced a strike. The nation was held to ransom and coal required by many industries and railways could not be produced in adequate quantities. The coalmine workers do not come under the Employees State Insurance (ESI) scheme, but what happened in the Bellampalli hospital is almost a daily occurrence in many of the 89 ESI dispensaries in the State, with workers swarming them to get certificates that they are suffering from some illness or other.

Under the ESI scheme, a worker is entitled to be compensated for loss of wages upto 91 days in a year when he is sick and does not have any other leave to his credit. Where a worker is having a chronic disease, he gets wage benefit upto 309 days. If a worker suffers injury during the course of work, the wage benefit is doubled and there is no time limit. He gets the wage benefits till he resumes duty. Unfortunately, according to the authorities, many workers have been made to believe that they are entitled to these wage benefits as a matter of right, whether they are sick or not.

But why do doctors give wrong certificates? A doctor answered by saying "when a man comes to us saying he is having severe stomachache and makes his condition appear genuine, there is no method of finding out that he is only a pretender." He pointed out that invariably workers came complaining of diarrhoea. "Sometimes we detain such persons for a couple of hours under the pretext of wanting to examine their stools. They either run away or protest and try to attack us."



As for the workers, they complain that medicines are not easily available in the ESI dispensaries and that the doctors do not examine the patients properly. They feel sickness certificates are not issued in deserving cases "while it is given to undeserving cases quickly".

The ESI doctors have a different tale to tell. According to some of them, the patients come and demand medicines which in their (doctors') opinion the patients do not require. Often, the workers bring prescriptions from private doctors and without producing the patients concerned, demand medicines. "Without examining the patients we cannot certify that they require certain medicines." Workers also brought their neighbours' children or relatives and tried to palm them off as their own demanding treatment at the ESI dispensaries.

The Directorate, Insurance Medical Services, Andhra Pradesh, suggested to the ESI Corporation that identity cards carrying the photographs of the family members of worker be introduced. The Corporation did not agree, as it felt that it was not feasible. A growing child changed fast and looked, after a period of months, different. Identification marks were noted in the cards issued to the workers but because of the rush of patients it was not possible to check them. At the ESI hospital in Hyderabad, a large number of purdah-clad women turn up at the out-patient department. It was difficult to verify their identity.

Doctors explained that workers complained of shortage of medicines when they brought prescriptions from private doctors who prescribed medicines with trade names. Not all medicines with trade names were under rate contract. Therefore, the doctors made available substitute medicines which were not acceptable to the workers. One doctor pointed out that the Indian Drugs and Pharmaceuticals Limited gave raw materials to two other pharmaceutical firms in the country who marketed the same substance under different trade names. The ESI made available the drug marketed by the IDPL itself. The workers seemed to think that the doctors were deliberately not giving the drugs marketed by the firms.

The doctors also said that if they insisted that the patients be examined by an ESI doctor or that the prescription should be from a specialist to whom the patient was referred to by the ESI the workers resented. The patients also wanted medicines to be issued for a full month "to avoid the inconvenience of coming to the dispensary frequently". It was pointed out that in Warangal town, tuberculosis patients were given tablets and drugs for a period of one month on the understanding that the patients would take the injections regularly. But the injectibles found their way to the market. The patients' conditions deteriorated. Unmindful of the loss of their health, they were interested in making money in two ways — through sickness benefit and by selling the drugs. The ESI doctors have begun to insist on the patients coming once in three days. It has helped in medicines being administered to the patients but also in regulating the dosage depending on their condition.

Y, beseeching him to go on leave so that he (X) could continue to work. Now, Y gets sickness benefit and some "commission" from X for helping to get some wages. During the "sick leave" period, Y does not keep quiet. He either operates a cycle rickshaw or works as a casual labourer elsewhere.

Indeed, many employers feel that sickness certificates are being issued to workers very liberally. They say that work is suffering because of this. Absenteeism being on the high side, production was going down. They have often complained that "sick" employees loiter in the factory premises. Even the ESI Corporation authorities seem to feel that the issue of sickness certificates in Andhra Pradesh is on the high side and have instructed that the practice be curbed.

that the employees of an establishment that engages more than 20 persons would be covered by the scheme. beedi workers, those employed in cinema houses, departmental stores and such organisations are not covered. Since rice mills and sugar factories are supposed to afford only seasonal employment, their employees also do not come under the scheme. There are about one lakh beedi workers in Nizamabad and surrounding villages. If the ESI benefit is extended to them, Nizamabad could have a 400-bed ESI hospital. The inspectors of the Regional Directorate of the ESI Corporation visit new areas to recommend the extension of the scheme.

Dual control

Right from the day the ESI scheme was implemented one has heard the complaint that there are not sufficient number of doctors in the ESI dispensaries and hospitals. There is dual control over the ESI scheme. The ESI Corporation is in charge of collection of the employers' and employees' contributions, disbursement of cash benefits and survey of new areas for the extension of the scheme. The State Government is in charge of the

companies are reluctant to come under the scheme as they feel that the managements have made better arrangement for them. One labour leader commented that those who wanted to increase productivity preferred to be outside the ESI "which is meant only to help those who want to be absent and yet get some wages".

A charge against the ESI staff is that they are not dedicated. A visit to the out-patient department of the ESI hospital, Hyderabad on October 12 showed the staff numbers were not to be seen, as scores of patients had

that the attention given to them was insufficient, began to demonstrate. They alleged that every time a wound was dressed, the assistant wanted money. The other complaints from the patients were: The ward boy came in a drunken condition and was habitually late by two or three hours. There was no security in the wards and the stainless steel tiffin boxes of the patients were frequently being stolen. Dogs roamed about freely even on the first floor of the hospital, taking away the bread supplied to the patients. The cots and other furniture in the ward were infested with thousands of cockroaches. Patients reported an improvement in the situation for some time, but with the "old cases" moving out and new ones getting admitted there was again deterioration in the services.

Insufficient space and staff are responsible for the allegation that proper attention is not being paid. The corridors of the OP department

A doctor treating a patient at the E.S.I. hospital in Hyderabad.

run away or protest and try to attack us.

Maternity ward

A man availing of sickness benefit sometimes has a three-fold advantage. In one town of Andhra Pradesh, a textile mill employs "badli" workers when their regular workers go on leave. If X were on relief duty and were to know that the man he was subsituting for was to return for duty, he would approach worker be introduced. The Corporation did not agree, as it felt that it was not feasible. A growing child changed fast and looked, after a period of months, different. Identification marks were noted in the cards issued to the workers but because of the rush of patients it was not possible to check them. At the ESI hospital in Hyderabad, a large number of purdah-clad women turn up at the out-patient department. It was difficult to verify their identity.

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At Nellimarla and Chittivalsa, tablets issued to the "patients" were found strewn outside the dispensaries some months ago. They were thrown away by those who were more interested in the "sickness certificates" than the medicines.

The doctor is obliged not to give false sickness certificates. Sometimes they are coerced and some have said that inducements not are held out to them. When workers do not get leave in the normal course, they try to get "sick" so that they can then get "paid leave". Workers wanting to go for harvest or to be at home for festivals or marriages resorted to this gimmick. Where the ailment did not require hospitalisation, doctors have started insisting on the patients turning up at the dispensaries at frequent intervals.

Not all workers in the State are covered by the ESI scheme. Though the ESI Act says

A doctor treating a patient at the E.S.I. hospital in Hyderabad

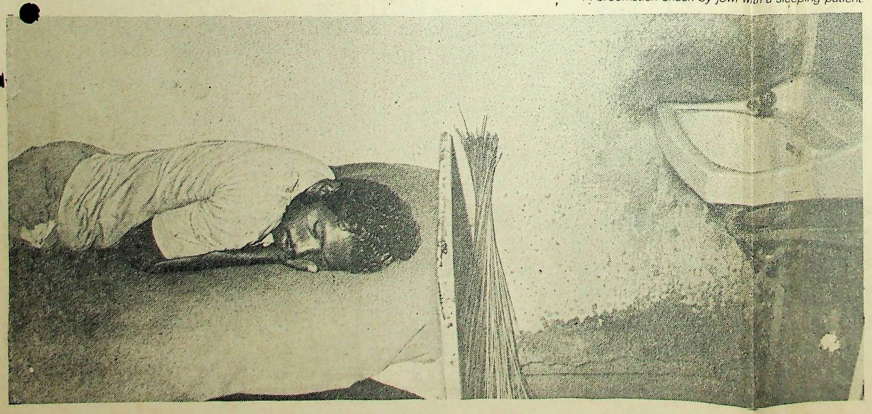
there are not sufficient number of doctors in the ESI dispensaries and hospitals. There is dual control over the ESI scheme. The ESI Corporation is in charge of collection of the employers' and employees' contributions, disbursement of cash benefits and survey of new areas for the extension of the scheme. The State Government is in charge of the medical part of the programme, providing doctors and nurses.

Doctors posted to the ESI hospitals and dispensaries are reluctant to join them. An ESI doctor is not allowed to have private practice and gets Rs. 200 per month as non-private practice allowance. Despite this, there are doctors who have private practice.

In many specialities, there are no doctors in the ESI hospital. For example, at Hyderabad, the post of orthopaedic surgeon has been vacant for over a year. There is no physiotherapist. TB patients are referred to the hospital for chest diseases where only 25 beds are reserved for workers.

Employees of organisations like the Bharat Heavy Electricals Limited, Andhra Pradesh State Road Transport Corporation and some cement

A broomstick cheek by jowl with a sleeping patient



who want to be absent and yet get some wages".

A charge against the ESI staff is that they are not dedicated. A visit to the out-patient department of the ESI hospital, Hyderabad on October 12 showed the staff numbers were not to be seen, as scores of patients had gathered at the counter. One patient who had been brought from Uppal 20 kilometres away, was neither able to sit nor stand and was writhing with pain. Perhaps, it was a case of appendicitis. For over half an hour, he lay on the floor, contorting himself into all positions before he was given an OP ticket.

Earlier this year, there was an unusual strike in the ESI hospital, Hyderabad. It was not by the doctors or the nurses but by the patients. The inpatients of a male ward, finding

Genuine patients suffer

THE ESI scheme, unfortunately seems to have side-tracked from its main aim. It is pointed out that some doctors attached to the ESI issue certificates to favour a section of workers, and authorise the distribution of medicine that often ends up in the black-market. This causes a temporary scarcity of essential drugs, apart from harming the cause of genuine patients. Other complaints are that comparatively healthy people occupy beds which could have been utilised by people suffering from acute diseases, and that the quality and quantity of food served in the hospitals leave much to be desired.

It is interesting that participation of the trade unions in the ESI scheme does not seem to have done very much to check corruption. Some employers are also known not to fulfill their commitments, and the Government draws up a list of them every year. Officially, there is also a free advisory service available to anyone connected with the scheme. However there are not too many callers.

Initially when the ESI scheme was introduced in 1955, in W.Bengal, all industrial reported an improvement in the situation for some time, but with the "old cases" moving out and new ones getting admitted there was again deterioration in the services.

Insufficient space and staff are responsible for the allegation that proper attention is not being paid. The corridors of the OP department in the ESI hospital, Hyderabad, are very narrow and when patients crowd there, there is hardly space to move about. With more and more industries being brought under the scheme, there is need to increase the staff and provide more accommodation, those connected with the scheme say.

Hyderabad Staff Reporter

units using power and employing more than 20 persons were brought under its purview. But later, in case of power using factories, units employing between 10 to 19 workers were also included. The scheme was also extended to restaurants, cinemas, theatres, hotels and road transport establishments. In the beginning only those drawing less than Rs. 500 a month were covered by its provisions. In 1975, the range was raised to Rs. 1,000 a month group. At present, nearly 10,000 factories, head offices, branch offices, sales offices etc. are covered by the ESI scheme, serving directly around 1.1 million employees in the State, and indirectly over 3.5 million people are served.

Annually, around Rs. 10 crore are paid to insured employees as cash benefit, the amount increasing steadily over the years, the rate of permanent disablement benefit and dependents' benefit were increased by 10 and 20 per cent respectively in 1977. Cash benefits are also distributed through a network of 54 offices.

The bulk of the relief is accounted for by sickness benefit, amounting to nearly half of the total official payments. Payments are made also for maternity, family planning, funerals and on other heads.

On an average, well over 1,00,000 accidents are reported annually. The ESI authorities have made effective arrangements for procuring artificial limbs form a specialised centre in Pune.

The ESI authorities run eight general and one tuberculosis hospitals in the State, while they maintain a number of beds in other general hospitals. Around 36,000 patients are treated annually.

Painters exposed to serious ailments

THREE years ago, in response to an increasing number of its members who were reporting strange and debilitating illnesses, the International Brotherhood of Painters and Allied Trades [illegible] running an "Ask the Doctor" [illegible] in its journal. The letters [illegible]ed in.

"I told the foreman I was getting numb around the mouth and in my hands," one painter wrote. "A stationary object would move as I [illegible]ed toward it," wrote another. And according to another, "I knew the solvents must be bad because when we came in to work each day we had to haul dead rats out of the rooms we had painted the night before."

There are about 400,000 painters, paint makers, sign painters, silk screen printers and tile and carpet layers in the U.S. who work with coatings or adhesives made with aromatic hydrocarbons and other solvents, often in places that lack adequate ventilation. Many of them have complained for years of feelings of dizziness or intoxication while on the job.

[illegible] recently, as paint manufacturers have incorporated new chemicals in their products and as the toxicity of some, such as toluene and benzene, have become more widely known, many industry [illegible] a number of government and [illegible]n officials have come to share the conclusion of Mr. Frank Raftery, the painters' union president, who said:

"Toxic chemicals are a major threat to painters that rivals or exceeds the better-known health threats to asbestos workers and even to coal miners."

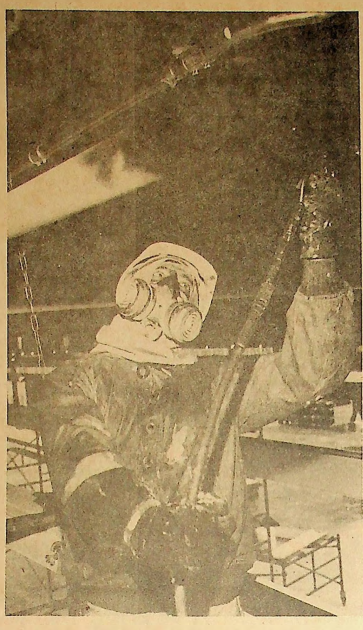
Dr. John Froinds, a government toxicologist, who is acting Director of the National Institute for Occupational Safety and Health, agreed that the chemical compounds in paint presented "new and serious problems."

"We are concerned about the hazards of painting to such an extent," he said, "that we are conducting extensive research into the carcinogenic and neurotoxic effects in the workplace. Obviously, further research is needed to evaluate these problems."

Neurotoxins are poisons that *destroy nerves or nervous tissue, resulting in neuropathy, or a dysfunction of the way the nervous system usually works.*

Major segments of organised labour have shown increased concern about the effects that these and other toxic substances have upon employees in the workplace. In the last year the painters' union, the United Automobile Workers and the American Federation of Labour and Congress of Industrial Organisations have set up special departments to investigate the problem.

Relatively few negligence or product liability cases have been brought against the manufacturers of the chemicals, paints, lacquers, adhesives, and plastics that contain potentially neurotoxic formulations with names like methyl-n-butyl ketone, toluene di-socyanate and dimethylamino propionitrile. According to Mr. Rodney Wolford, an occupational safety official at the painters' union, the first symptom of neuropathy is depression, and "the poisoned workers find it very hard to write us about it, much less to bring lawsuits."



Among painters and others exposed to solvents for long periods in poorly ventilated areas, the symptoms of toxicity often begin with on-the-job dizziness, exhilaration, headache, blurred vision and slurred speech. Sometimes they progress to hallucination and permanent disorientation, paralysis and other symptoms of injury to the central nervous system.

A mortality study conducted for the painters' union among workers in New York found their life expectancy to be 11 years less than the average American's.

In 1975, a pioneering medical survey of 1,000 painters, paint makers, tile and carpet layers and wood finishers found that 71 per cent of those studied reported some toxin-related disorientation on the job. As many as four per cent said they had lost consciousness while working.

The study by Dr. Irving J. Selikoff of Mount Sinai Medical School found that painters exposed to solvents were more likely to have accidents, such as falls from scaffoldings and that they had potentially dangerous difficulties driving home from work.

More recently, a study of paint hazards by the Johns Hopkins University School of Public Health found that there were "minimally over 300 toxic materials and 150 carcinogens potentially present in paints." Fifty-seven per cent of the paint solvents identified in the study are listed in the Registry of Toxic Substances compiled by the occupational safety institute.

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One of the first acts of the Reagan administration was to table a proposal for more explicit labelling of all the hundreds of thousands of products containing chemicals that are known to cause symptoms of toxicity in high concentrations. The products are used by an estimated 25 million American workers, according to the Labour Department's Occupational Safety and Health Administration, which developed the proposed regulations in nearly five years of negotiation with the chemical industry

Under the proposal, the labels would have listed the products' ingredients, given more specific directions for their use and described symptoms and treatment of toxic reactions.

Since the proposed labelling regulations have been tabled, representatives of labour have been moving on State Legislatures in an effort to enact all or part of the labelling rules on a state-by-state basis.

But if states adopted conflicting requirements for the labelling or the use of potentially toxic substances, one chemical trade association official said, "That would drive the industry right up the wall, and we might end up actually going for some federal regulation."—**New York Times.**

OCCUPATIONAL HEALTH

VOL. NO. 1

PRESIDENT'S MESSAGE

Members of the Delhi Branch of I.A.O.H. in electing me as their President have laid a big responsibility on me. Whereas I am grateful to them for this expression of confidence in me, I am very conscious of the responsibilities which I have to shoulder during this period. This Branch being so young has lot of teething problems which have to be overcome.

My predecessor Dr. S.S.L. Verma with his dynamic leadership infused life into this new Branch of the Association and organised the Branch with the help of so many of its active Members specially Dr. B.N. Bhattacharjee, Dr. H.C. Govil, Dr. Gupta, Col. S.L. Chadha and Dr. Pran Nath. The remarkable work done during 1976 in organising the All India Conference of this Association is a standing proof of the capability in organising, of the Members of this Branch. Whereas we do not have to organise another All India Conference of the nature done in January, 1976 in near future, there are lot of other activities which we have to do to keep the Association alive and kicking. For any Scientific Association of this type with a narrow and limited scope like Industrial and Occupational Health, it is essential to my mind that we have a set of dedicated workers to take the lead and keep on doing interesting and useful activities throughout the period.

Personally I feel that for the Delhi Branch of I.A.O.H. to be active, it is essential that its membership must increase to atleast three-fold of what it is. Unless we have about 100 Members we cannot expect in our Scientific Session, an attendance of 30 to 40 every time because due to other engagements and being out of station, a number of Members cannot attend every meeting inspite of their desire to do so. Every Member therefore, and the Members of the Executive in particular have to spread the message of this Association amongst the Medical as well as non-medical officials in the Industry and different occupations and try to enrol as many members as possible. Whereas Dr. Pran Nath and few other members have shown responsibility in this direction efforts of others resulting in increased membership is still awaited. For this we should approach the Medical Colleges and specially departments of Social & Preventive Medicine to become members. This will not only increase

Dr. J. C. Mehta
M.D. (Med)., MRCP., M.D. (Hons), S.P.M.
Chief Medical Officer, Northern Railway

the Membership, but enrich the quality of scientific work done by us. I am sure with a proper approach most of the staff of departments of Social and Preventive Medicine in the Medical Colleges would like to join. Members from big Industrial Houses should also be searched.

It is also essential that our Association holds some Refresher Courses about Occupational Health to prove its utility to the community. The Scientific meetings have to be regularly organised giving enough time for the participants to ensure their attendance and fixing the venues in such a way that it is convenient for most of them to attend. Apart from the talks on useful and interesting subjects, symposia and seminars should be held at these Scientific meetings. For the annual conference of the Association at Ahmedabad, we are sending some Members so that full participation of this Branch is ensured. Suggestions from all doctors to infuse more life in the Delhi Branch will be most welcome and should be offered without hesitation.

I wish the very best for our Association and I am sure with the help of all of you, we will be able to improve this Branch further.

From Editor's Desk

Industry is the bulwark of any nation. No industry can proceed at full speed unless its individual human units remain healthy both physically and mentally. The worker's health is really vital to the quantity, quality and continuity of production. One skilled worker's absence because of preventable illness can greatly disturb the smooth functioning of the production line and cause losses out of all proportion to expectations because of disruption of team work.

In addition to non-industrial causes of illness, the industrial employees which include the workers, supervisory and management personnel, are particularly exposed to specific hazards which are attributable to various industries and occupations.

Administration of curative medicine and surgery only, is not enough to keep them healthy. There has been tremendous advances in industrial and occupational health specialities with particular stress on industrial hygiene and toxicology, sanitation and health, conservation procedures, role of nutrition, fatigue control, mental hygiene, vital statistics and adaptation of the worker to the job through job analysis aptitude and psychological test. It is the application of these advances which is a must to improve and maintain the health of the workers. Remedies have to be found and provided to prevent industrial accidents and occupational diseases.

The efforts of those who have been identified with the conservation of the health of the working population must be intensified. Industrialists and physician must contribute their share in the responsibility for keeping the employed physically and mentally fit, thus protecting the manpower behind our industrial mobilisation which is rapidly growing.

If we as members of this association become thoroughly conscious of our responsibilities and opportunities and to our scientific knowledge of medical diagnosis, prevention and treatment we add an equally thorough knowledge of the best economical, political and social methods of applying that knowledge to the good of both the employers and employees alike, the public, the Govt. and the employers will be willing to listen to our suggestion and seek our advice.

DR. MAHESH CHAND GUPTA
Editor-in-Chief

We have done it.....

Hotel Hygiene Course

The hotel hygiene course was conducted for the Indian Tourism Development Corporation, hotel supervisory staff from 3rd to 5th August at the Lodhi Hotel, New Delhi through lecture demonstration and panel discussions and film shows and by conducting this course, the Delhi Branch earned Rs. 800/-. The lecture course was designed by Dr. B.N. Bhattacharjee, and Dr. R.K. Sen Gupta. Other courses were held in 1975 at the Ashoka Hotel, Oberoi Intercontinental etc. and in 1975 the Delhi Branch earned about Rs. 3000 from various groups of hotels.

Consultancy Services.

The Delhi Branch designed consultancy services for the small scale industries who have no resources to look after the health of the workers as well as in designing the safety measures for prevention of accidents and environmental pollution etc. Dr. Pran Nath, Certifying Surgeon, Haryana and Mr. Jeeta Chandra, Chief Engineer, Gedore Tools of India who are very active members of the Delhi Branch rendered this consultancy service at the Faridabad Industrial Complex. It became quite popular and they have received requests from the bigger industrial complex like Escorts, Modipon etc. for rendering such consultancy service.

Technical meetings

Two technical meetings were held, one in the Northern Railway hospital, New Delhi where Dr. J.C. Mehta, reviewed the strong and weak points of the Delhi Branch activities in relation to holding of the annual conference, as well as the summary of the technical papers.

A second technical meeting was held at Faridabad where Dr. Pran Nath read a paper 'On occupational Health hazards in engineering industry' and Mr. Jeeta Chandra, Chief Engineer Gedore read a technical paper on "Engineering central of certain Occupational Health hazards in Engineering Industry".

Discussions with INTUC

Secretary, Delhi Branch took up the initiative for motivating the INTUC for creating conditions for improvement of the health of the industrial workers, and as also for establishment of 'Holiday Homes' for providing rest and recreation facilities for the workers.

The Delhi Branch held its annual general meeting on 16th October, 1976 and the executive committee was formed after due election. The branch members conveyed their thanks to Dr. S.S. Verma, Ex-President for his excellent leadership during his tenure of presidentship.

Dr. J.C. Mehta, Chief Medical Officer, Northern Railway, Baroda House, was elected as the new President for the year 1977.

Future plans

During the last meeting of the year 1976 the Delhi Branch drew up a programme for year 1977 as under:-

(a) The Delhi Branch will publish a quarterly newsbullitin from January, 1977 to keep all the members informed about its activities and also for facilitating exchange of views. This bulletin will also threw some light on matters of importance in the field of occupational health in India and other parts of the world.

(b) **Membership campaign:** The Executive Committee decided that all the members of this committee should make at least two new members personally and contact various industries to send their representatives as a member of this branch. It will not be out of place to mention here that Dr. Pran Nath, who is the Vice-President of the Delhi Branch, had succeeded in enrolling 16 members upto February, 1977.

(c) **Technical meeting:** Delhi Branch has decided this year to hold 6 technical meetings, one each at Gaziabad, Faridabad, Modinagar, DCM factory and two at the headquarters.

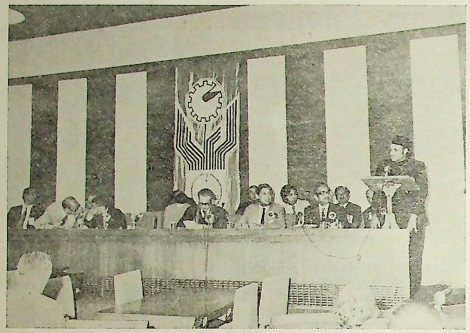
(d) **Production of a booklet on Indian Occupational Health:** The Delhi Branch has decided to produce a small booklet for depicting the aims and objectives of the IOH and distribute it to the industries and trade unions as well as to others interested in the field.

(e) This branch has also mooted the idea for establishing intimate contact with various ministers connected with industry i.e., the Labour Minister, the Health Ministry, Ministry of Petroleum and Chemicals etc., Ministry of Railways etc. It also proposed to make a liaison with Trade Union Congress, ILO, WHO, UNICEF etc. so that the image of the Delhi Branch of the Occupational Health Association comes upto expected level. The Branch has also proposed that it is ready to work as a liaison office for the IOH headquarters at Delhi, in order to raise its image in the eyes of the administrators of the country.

(f) **Workshop of occupational health :** The Branch has also decided to hold an annual multidisciplinary workshop on occupational health in the month of October, 1977. The details of the workshops are under preparation.

(g) The Branch also proposes to hold a National Seminar in 1978 at Delhi, with the approval of IOH. It is strongly felt that this seminar would contribute greatly and provide the necessary platform for the exchange of newer knowledge and experience in the field of occupational health between top-specialists of national and international eminence. □

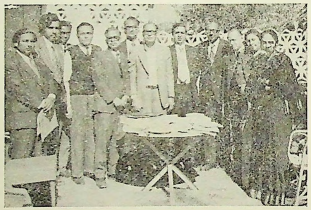
GLIMPSES OF ANNUAL CONFERENCE



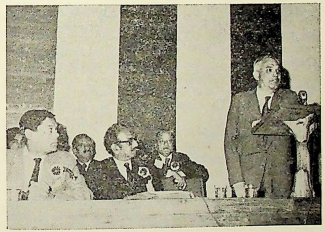
Dr. Karan Singh
Union Health Minister
Inaugurates the
Conference

A view of Conference Delegates

The Delhi Branch hosted the 26th Annual Conference from 10th to 12th January, 1976 at Vigyan Bhavan, New Delhi. Dr. Karan Singh, Union Minister of Health inaugurated the Conference and Mr. Bal Govinda Verma, Deputy Minister of Labour in his key-note address, highlighted the role of the Indian Association of Occupational Health in preventing accidents and promoting safety of the health of the workers in the country. High dignitaries like the Director General of Health Services, representatives of W.H.O., I.L.O. and Press Information Bureau were present in the inauguration ceremony.



Preparatory Committee
Meeting



Scientific Session in Progress

About 150 delegates from all over the country attended the conference for three days continuously. 52 technical papers were read by the various specialists in the field of occupational health. Dr. J.C. Mehta, the Convenor of the Scientific Committee accommodated every person to read their technical papers even though it was presented in the last moment. On 12th January a field visit was arranged for all the participants to see the Faridabad industrial complex in Haryana. They were served with delicious lunch at the picturesque site on the banks of the Bhadkal Lake After returning home from Faridabad, the first Central Council meeting was held at Delhi under the Chairmanship of the new President, Dr. S.C. Chakrabarty.

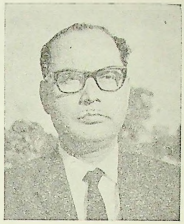
Dr. Karan Singh at
Occupational Health
Exhibition

Award giving Ceremony

Modern Trends in Future Environmental Hygiene Studies

By

Dr. B. N. Bhattacharjee



Introduction

The old concept of health hazard to the workers in the micro-environment is now fast changing because the industrial workers are also exposed to the pollution of macre-environment. It may be very difficult to prove where the workers acquired these health hazards, particularly, terratogenic, mutagenic and carcinogenic conditions. In the past many of the studies have proved that minerals and heavy metals like lead mercury, zinc, manganese etc. caused health hazards and diseases in the micro-environment of the industry. Emission of sulphur dioxide, carbon monoxide and other gaseous substances and dust in air as well as the industrial effluents thrown in the water or land have been important contributing factors for macro-pollution, outside the industrial establishments. But the total environmental pollution is now known to be caused not only by industry but due to the increase in population, disposal of untreated sewage, garbage and other wastes by the local authorities in the water or land, use of new chemicals, DDT & fertilizers etc. It cannot be denied that industrial growth creates problems of effluent and waste in natural environment, but the urbanisation of human settlements, supplies of basic requisites like water, housing, transport, thermal power can all have adverse effects on the enviroment in the absence of careful planning. Some of the major environmental side-effects have known to accompany in varying degrees, the process of development in agriculture, transport and human settlements. Studies should be taken up about the new pollution in the micro-environment of the industry and its effect on the worker as well as vertical studies on the health of the worker at the macro-pollution level wherein the workers are exposed to health hazards for the second time. Some points for future environment hygiene studies in the industries has been highlighted in this paper keeping in view the future trends of environmental pollution to occur with the growth of science and technology, affecting the various aspects of human life.

Some Selected Problems

It has now been proved in many countries that by reducing the total quantity of pollution to which one is exposed over a life time could greatly reduce morbidities and deaths from several chronic diseases. As such a study has to be developed for the workers, taking into account all their social, psychological, socio-economic life and living conditions. A valuable instruments in the activities of this kind should be the utilisation of special work environment, hygiene studies and laboratory examinations. Current work operations can be critically examined in some cases by building up essential segments of operations, introducing modifications and then testing them. The exploitation of the development of new technology aimed at improving conditions of different work places is a task deserving high priority. But it is a task that must be pursued systematically. Manufacturing firms, industries, safety authorities and even trade unions and managerial personnel must ststematically identify problem areas, define sub-problems and by commissioning experts, to tackle them, and explore some solution. Public bodies entrusted with the responsibility for research and development programmes in the technology, medicine and the behavioural sciences must support, initiate and coordinate all research and educational projects in order to (1) lay a better foundation for concrete solutions and (2) open opportunities for new or alternative process which promote equally good products to be made without inflicting deletirious effects either on the worker's environment or on the external environment.

Of late many industrial countries have rapidly increased interest in the problem of work environment. Greater demands have been raised to abate risk of accidents and to reduce the perils of health of the working population. Thus the points of consideration are mainly:-

1. Preventing occupational risks.
2. Promotion of health.

3. Capacity for work.
4. Social security for workers.

To solve the above mentioned points micro-environmental assessment and its management inside the industry should be planned. The points for consideration with regard to protection of health hazards caused to the industrial workers in the macro-environment are (1) Public-laws, (2) Technical cooperation, (3) funds, (4) public opinion and (5) Trade Union movement.

Need for future environmental hygiene studies in Industry

Much of the documents and data are available in relation to micro-environment and its effect on the health of the workers. But with the introduction of new chemicals and synthetic materials in the old industries unknown health hazards are perhaps creeping in. An example may be cited in this respect caused by poly Vinyl Chloride. PVC was thought not to harm workers health until an unusual condition affecting the bones of the fingers of the workers was first reported in 1960's. This condition became known as acro-osteolysis (AOL). In early 1974 reports appeared that liver cancers are being found in experimental animals. This type of cancer is known as angio-sarcoma. Now it has been proved in U.K., Sweden, U.S.A., and USSR that uncontrolled doses of this Poly-Vinyl Chloride has caused angiosarcoma and consequent death of industrial workers. Perhaps many more synthetic materials and chemicals are producing unknown insiduous diseases amongst the industrial workers for which vertical studies are needed. Increase in the incidence of cancer in the highly industrialised countries has been linked up with the environmental pollution but no exact identification has been possible whether it was due to work in the micro-environment or due to pollution of the macro-environment. We are aware of many acute diseases related or emanating from the industry, than about the chronic effects. Little is known about sinergisitic effects of different circumstances or agents in inter-action but now we know that they do occur. More recently, support has been found for the opinion that reducing the total quantity of pollutants to which one is exposed over a lifetime could greatly reduce the morbidities and deaths from several chronic diseases. If the liftime lead imposed by polluted air in highly exposed areas were to be cut in half, diseases of the respiratory tract would decline sharply. To mention just one example effect of Air pollutants both in the workplace and outdoors may be cited. The best promise of achieving substantial reductions is to tackle pollution where the percentages are highest, that is at the places where people work.

A close interplay obtains between the environment of work and the external environment i.e., between microclimate and macroclimate. It is the strain imposed on man round the clock from all sources that is counted. From now on, therefore, every effort must be made to demolish the present contrived barriers between work environment and the surrounding environment.

A programme to improve the work environment in line with the present of aspirations would definitly incur extra annual outlays. Hence the massive effort of work environment cannot be implemented without affecting on the wage levels, i.e. the way of allocating wage costs into wages, social and health services, preventive measures against occupational hazards etc. International rules on aspects of health upon work environment may contribute to reduce these difficulties and will be of general value to protect and promote the health of man at work.

Conclusion

By 2000 A.D. India's population will be around 950 million and 35% of which would be engaged in industry. Unless environmental hygiene studies are undertaken seriously by them at the work place as well as in the community, outside the manufacturing units, new health hazards due to environmental pollution cannot be put to a halt.

Modern trend of environmental hygiene studies is a team work. The various dimensions of the problems has to be tackled by engineers, doctors, chemists, plant managers and trade union who will have to find out measures to prevent the dangers of health hazards and risk of new diseases. □

2. Providing treatment service-to maintain a safe and healthy working environment by providing prompt and efficient initial treatment of illnesses and injuries at work. This also provides epidemiological evidence of hazards.

3. Controlling recognised health hazards. Eliminating the hazard by substitution of the process or at least by successfully controlling the ill-effects.

4. Research and Development- by identifying the unrecognized hazards. Detective work in identifying health hazards- from the apparently trivial that interfere with comfort and efficiency to those that endanger life. R & D on ways to control them.

This depends on two distinct types of enquiry:

(a) The clinical observation of sick individuals who seek treatment.

(b) Field surveys and other epidemiological methods. R & D on ways to further our medical benefits also.

5. Avoiding potential risks of disease and injury by the application of ergonomics considering fatigue and adverse psycho-social factors.

6. Well-person screening and treatment by screening for early evidence of any disease that may be setting in- both occupational and non-occupational. In particular, occupational health service gives unrivalled opportunity for identifying and dealing with mental illness in its very early stages.

7. Executive health supervision.

8. Psychological guidance and counseling. Occupational health here serves by two different types of counseling- first at attendance for treatment and other routine examinations-this ranges from simple advice about a specific complaint to a more extensive counseling about personal, social, emotional and even economic problems- secondly when employees come voluntarily for advice about a much broader problem connected with their work or domestic life. Psychological guidance and counseling forms an important and useful function of Occupational Health Service.

9. Health education -
Both individual and group by educating the employees towards healthier modes of living.

10. Supervision of welfare amenities especially canteen and periodic checks of Kitchen. Special periodic examinations of food handlers and canteen staff.

Thus we go on .....
Striving, tirelessly, stretching our arms and embracing health in all its aspects.

o-o-o

Addapted from

a) WIDENING HORIZONS
BHEL
(A Government of India Undertaking)
High Pressure Boiler Plant,
Tiruchirapalli - 620 014.

b) Occupational Health practice, R.S.F. Schilling, Butterworths, London 1973.

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(Handout of Ross Institute Unit of Occupational Health, St. John's Medical College, Bangalore - 560 034.)

CENTRAL APPROACH TO RURAL COMMUNITY HEALTH SERVICES

Fundamentally, the health services have to be viewed in the context of overall integrated development of the villages. Health services cannot be fully successful if they are pursued in isolation from the general development activities of the area.

The community health services must be area based and population based -- providing the total spectrum of health services to the total populace living in a defined geographic area. Primary health care must be available at the doorstep of the recipients.

1. Area Coverage -- Regionalization:

We must accept responsibilities to provide health coverage to the population of a defined area.

Selection criteria of the area:

A) Need - Poverty and illiteracy
high incidence of diseases
non-availability of health services.

B) Suitability:-

The area should not be too far nor should the area be too near to /~~Bangalore~~ -- then the people will be visiting the city / ~~xxxxx~~ for their health needs.

Assurance by the community for skilfull cooperation and help.

HOW ? for example:

i) If there is an already existing useful organisation that can provide us useful assistance.

ii) If the village is well united and there is an effective panchayat.

iii) If the village has, or is willing to immediately start, a Village Health Committee, which could help us in several ways, acting as an effective link between the health workers and the villagers. Such a health committee should preferably be considered a specialized organ of the panchayat unless the panchayat is divided and ineffective. Then the Village Health Committee can be an independent institution. But it must enjoy the confidence of the entire village population.

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iv) If the villagers are willing to contribute their share by:

1. Agreeing to pay a small insurance charge
2. Agreeing to do Shramdan for some health projects
3. Agreeing to contribute volunteers that will help run the health programme.

v) If some data is already available about that area due to previous or on-going survey etc., either in connection with a health programme or as a part of general development activities.

2. Total Population Coverage:

The whole population must be covered.

Priorities: The weak and the vulnerable: Children below 6
Expectant mothers
Nursing mothers

Promotion of health and prevention of disease.
Nutrition, Sanitation, Immunisations & Health Education
Adequate simple records.

3. "Health Insurance":

Every body pays.
There may be a graded scale, depending upon the economic status.

Advantages: Greater interest taken by the community.
Greater community participation.
People feel they own the programme-and it is their (as indeed it always should be).
People who pay can also ask for good services, and who can complain if the services are not good.
Keeping accounts develops the idea of accountability.
People do not value the treatment that is given free.
They may even throw away expensive drugs, thinking them worthless.
Getting things free is not a good habit. It should be discouraged.
Some people consider it ethically wrong to give nor take things free.
There is no such thing as FREE. If the villagers are not paying for it, somebody else must be paying for it.

4. The National Context and Constraints:

Ours is a poor country.
Our health services should be affordable on a countrywide basis, perhaps adding upto a few rupees per head per year.
It is no use creating an IDEAL or achieving "excellence", which cannot be copied on a large scale.

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Instead, we should encourage local leadership, local initiative and self reliance. At a practical level, we should select suitable educated young men and women from the villages themselves, and train them as health workers. We should also involve the community in all health work, right from the stage of planning onwards.

9. Community Participation:

A community should consider the health services as their own. Community participation is the sine qua non of any successful community programme. This is one reason why the community must pay for its health ~~xx~~ services partly, if not wholly.

The community must be involved in all stages of the community health programme, including decision making.

Important areas of community participation:

Planning.

Financial contributions.

Selection of workers from the community.

Evaluation of their work.

Village Health Committees can play a very useful role here, as already mentioned.

10. Social Role of Health Education:

Health education is essential in a democratic set-up in order to elicit the willing and enlightened cooperation of the people

It increases peoples competence to look after their own health, thus fostering self-reliance.

It helps people take greater interest in their health services.

It helps people identify incompetent workers or incorrect measures.

EveryBody is interested in the working of his/her body, and in health. They will pay attention if health education is imaginatively carried out, using for example puppet shows, one act plays, practical demonstrations, mobile exhibitions, etc.

The following topics should be covered:

First-aid

Simple nursing

Body knowledge

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Yoga

Personal hygiene

Balanced diet

Some simple preventive measures etc.

11. Phasing and Pilot projects:

We should start with a small area or start with only a few services or both.

We should expand and multiply health services as we gain more : -

insight
experience
confidence
acceptability
efficiency

12. Essential Steps:

To Implement the Community Health Programme Objectives:

To create comprehensive integrated community health services for the total population of defined rural areas, with emphasised on vulnerable groups and on prevention.

Such a service should be made available on aregional basi alongwith effective referral facilities.

Summary of Steps:

∠ for the

1. A managing committee ~~[illegible]~~, ~~[illegible]~~ Community Health Programme should be established. (if necessary)

2. Constituting a "Planning and Implementation" Committee for the Community Health Programme.

3. Selection of suitable area or areas of work. Selectio criteria already mentioned in the general approach.

4. To study the area(s) to define its problems and assets.

Surveys: This will involve planning and conduction of surveys cove ing the following variables:

Demographic

Socio-economic

Health - Existing problems

- Existing facilities

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5. Planning: Preparation of preliminary plan
Discussions
Readjustments
Finalization of the broad plan

6. Implementation: Selection and training of workers
Building and furnishing of hospitals, health centres etc.,
Phased beginning of health services

7. Records -- Should receive special attention.

8. Evaluation of Community Health Services -- both concurrent and terminal. This should help better plannings:

Planning
Programming
Administration
Evaluation.

* * *

(Voluntary Health Cell)

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THE NEEDS OF OCCUPATIONAL HEALTH:

Occupational Health can be defined as the promotion and maintenance of the physical and mental well-being of workers with particular reference to the jobs they are doing. This also includes the effort to achieve a psycho-physical balance between an employee and his job. Quite a complete health-care programme-a comprehensive approach to the total health needs of the employed population-starting right from the time of recruitment to extend throughout an employee's working life.

Here is a service which goes to the workspot and studies the man in action before he gets into inaction.

Here is a service which aims at the well-being and growth of an employee as a total man.

'What cannot be cured must be endured' is now a story of the past. It can be prevented.

WHAT OCCUPATIONAL HEALTH DOES - ITS CONTENT:

An Occupational Health Services will conducts regular medical examinations of its employees-right from recruitment onwards. Positive promotion of health, specific protection against industrial health hazards and communicable diseases, medical aid, supervision of work places at intervals, health education, psychological guidance and the maintenance of health statistics are all included in this service.

As a first step, it protects the employees' physical and mental adjustment, in particular by the adaptation of work to man and each man to his job.

HOW OCCUPATIONAL HEALTH WORKS:

1. Placing people in suitable work. Through pre-placement and periodic medical examinations and placing employees in jobs that are suited to their physiological and psychological equipment. Preplacement examination also provides baseline data together with periodic examinations. Periodic examination is a monitoring procedure supplementary to environmental monitoring.

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COMMUNITY HEALTH CELL
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OCCUPATIONAL HEALTH

Industry is not just production, machines and their maintenance, but a group-a special group of productive people at work, their anxieties and worries, their hopes and aspirations, their health and happiness. Therefore the promotion of "Positive Health" among the employees with special reference to work and the psychophysical environment inside the factory is an absolute essential for better output and happiness in industry. It is only a healthy, strong and productive work-force that can contribute to the national prosperity and the all-round development of the nation. Indeed, Man Maintenance is more important than Machine Maintenance.

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HEALTH HAS MANY FACETS:

"Health depends on many factors. It depends on the circumstances, physical, social and psychological. It depends on the influence of home, on matters like nutrition, housing, happiness in industry, industrial hygiene, personal hygiene and most important of all on a man's work". How many of us are aware of the influence that work may have on health and that a person's health may affect his or her capacity for work? And, so, our conception of health goes much, much farther; farther than it is normally taken to be. Farther than you can even imagine. The well-being and growth of an employee as a total man - 'A state of complete physical, mental and social well-being and not a mere absence of disease or infirmity'.

HOW TO MAKE PEOPLE HAPPIER:

Considerable thought has been given to it and a seemingly simple formula has been chosen. It is 'adaptation of work to man and each man to his job'.

Simple? Isn't it?? But when the formula is expanded it opens up new vistas of healthful and happy living. 'Occupational Health Service'. That's it. We believe that tapping employees' chests perfunctorily when they fall sick and come to the hospital is not enough. That's why we advocate an Occupational Health Service. Occupational Health deals with healthy people at work everyday and sees that they remain healthy, that fit people become more adapted to their work.

Occupational Health works while they work.