

# It Pays to be Technoliterate

by Aasha Mehreen Amin

WHEN the drain in your bath-tub overflows or the flush breaks down or your fridge threatens to attack and make ominous noises do you panic and rush for the nearest plumber or do you attempt to fix the problem? If you are in the panic-stricken category because you simply do not know the mechanics of your machine then according to Dr David Pucel you are a technoliterate person. Dr Pucel, a professor of vocational and technical education at the University of Minnesota is concerned about making America technoliterate.

If the term seems a little too technical, its explanation is not. The way to technoliteracy involves two basic steps. The first step is understanding how technology evolves to satisfy human needs. The second is being able to work with technology i.e. tools to solve problems.

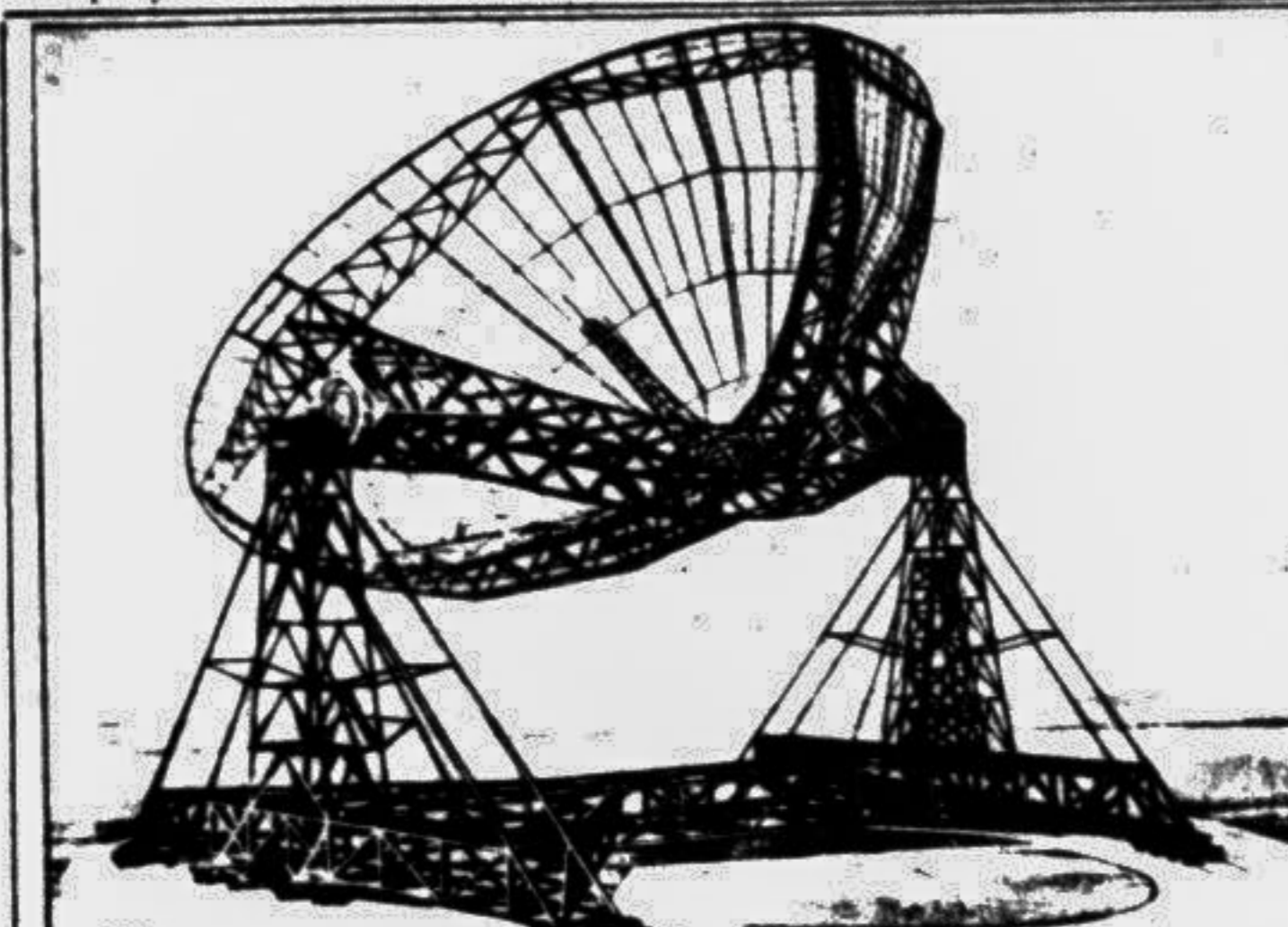
For Dr Pucel the importance of technoliteracy cannot be emphasized enough. He believes that those people who are not technoliterate will fall behind those who are and will not be involved with decision making. They will therefore have less control of their lives. He gives the example of automobile technology which has become increasingly complicated or at least seemingly so. Years ago, says Pucel, if something went wrong with your car you would know how to fix it. Nowadays we are at the mercy of the auto mechanics for every little problem. It's not so much that the technology is so complicated but that we simply do not know the basic mechanics.

Historically in America, claims Pucel, men have been more technoliterate than women especially the older generation of men. This is not because women are in any way less intelligent than men but because men have traditionally had more opportunities in school to get technical and vocational training. Why is it that it is believed that sometimes when a woman brings a car to a mechanic the bill is higher? asks Pucel, typically a man knows more about cars and so

cannot be as easily fooled. Recently, however, the trend is changing. Pucel believes that fewer and fewer Americans are becoming technoliterate. Part of the blame goes to the change in the curricula of high schools. While before there was an emphasis on vocational education, industrial art and other applied subjects, nowadays these areas are being phased out. The reason for this says Pucel, is that the content of these programs was based on the technology of the past and so are no longer as relevant. Yet these programs are essential according to Pucel, they just have to be revised and updated to suit present needs.

Minority groups are at a great disadvantage because of their technoliteracy. Pucel refers to a panel of Project 2061 of the American Association for the Advancement of Science which criticized the educational system for not providing students especially minority students with an adequate education regarding technology. When making hiring decisions, he adds, employers are reluctant to

choose minorities because many do not have the basic technical knowledge required. One of the most important steps to technoliteracy, says the professor, is creating basic awareness. This could be done through programs on public TV stations, books on how to do things, etc. Pucel says that in order to understand technology people have to understand how it evolves. Technology evolves through invention, because of human needs. Schools should place special emphasis on technoliteracy so that awareness is created at an early stage. The technologies with which students should become familiar include materials, energy, manufacturing, agriculture and food, biotechnology and medical technology, environmental, communications, electronics, computer technology, transportation and space.



Many stars broadcast radio-waves as well as light-rays, and there are also dark radio-stars which cannot be seen at all, but have to be "listened-in" to with sensitive wireless receivers connected to direction-finding aerials like those used in radar. Such objects are heard as hissing or whistling noises, usually very faint. This picture gives an artist's impression of a giant "radio-telescope" designed especially for the study of radio-astronomy at Jodrell Bank, Cheshire. Courtesy — Wonder Book of Wonders

edge technoliteracy is aimed at finding technical solutions to human needs.

According to Pucel, technoliteracy is an essential ingredient for operating as an efficient citizen. In his paper on Technology Education, he says: If citizens do not have some what similar backgrounds in fundamental technology, different individuals will be at widely varied places when discussing or adapting technology related to their lives or work. Those who are technologically literate will be at an advantage over those who are not (they) will view technology as a tool to accomplish goals, those who are not will be "technopeasants".

Pucel says that it was through observing young people around him that made him realize how technoliterate this generation of Americans are. While teaching courses I observed how far back we've had to go back just to start the process. The basic knowledge is not there. Schools are obviously not doing their job. The professor also mentions a particular mind set that people nowadays have of shrinking away from even trying to do something unless they are given specific instructions on how to do it: "Nobody wants to say — "OK I'll take a shot at it."

In his personal life, Pucel has constantly lived with this motto of taking a shot at things, something that has been instilled in him by his father and which he has taught his own children. At thirteen, Pucel helped his father build a motel which they did all by themselves including all the plumbing and electrical wiring. Says the author of over 90 publications and 3 books, "We figured that if someone else could do it so could we". This attitude is summed up in a poem by Edgar A. Guest called "It Couldn't Be Done" that Pucel introduces in his paper on technoliteracy. The last lines are:

"Just start to sing as you tackle the thing That "cannot be done", and you'll do it."

Note: The interview was taken in Minneapolis, Minnesota (USA) in 1993.

# Bokful: A Tree for Beauty, Food, Fodder and Soil Improvement

Dr Mokbul Hossain

RECENT years have seen a dramatic new interest in the fast growing nitrogen fixing trees of the tropics and the subtropics. Both scientists and development specialists alike have shown interest with some species of plants having exciting potentials to sustain and improve the soil enhance crop production and provide valuable products. In many cases, farmers have been using these trees for years, accumulating an invaluable knowledge base from which to improve tree productivity and usefulness. Following is a description of a plant species Bokful (*Sesbania grandiflora*) which has potential for beauty, food, fodder and soil improvement.

*Sesbania grandiflora* locally named as Bokful is a tree that grows rapidly, provides shade and is often grown as an ornamental. This soft wooded tree is used as fodder and its flowers as food. The plant is planted in gardens for its intercropping compatibility and soil improving properties.

### Botany:

*Sesbania grandiflora* (L) Poir is a tree that grows to 8-10 m in height. The pink-red or white flowers of this papilionaceous (pea-like flowered) legume are unusually large (5-10 cm in length and about 3 cm in wide before opening); this novelty may be the principal reason for *grandiflora* having been distributed by man throughout the tropics and subtropics.

*Grandiflora's* pinnate leaves may be 30 cm long, with 12-20 pairs of oblong, rounded leaflets averaging 3-4 cm long and about 1 cm wide. The leaves are borne at the terminal ends of branches and the canopy is open, with a thin crown which produces light shade. Its racemes bear 2-3 flowers. The pods are usually 30-50 cm long by about 8 mm wide. The seeds are tan to reddish-brown. The trunk may reach 25 cm diameter at breast height. *Grandiflora* may live 20 years or more. The plant species is found in cultivation

throughout the tropics and subtropics.

Because wild population of *grandiflora* are unknown, its natural habitat is uncertain. *Grandiflora* is grown most successfully in the low land tropics (below 1000 m elevation) and warm, frost free subtropics. It can be grown in regions with as little as 800 mm rainfall as much as 2000-4000 mm.

### Uses:

The reported uses of this plant species are for fuelwood, forage (leaves, pods), food

and is a further detriment to either of these uses. The trunk may be used as poles for temporary shelters and shades, but they may not last very long due to rot and insect infestation.

### Food:

Leaves, seed pods and flowers of *S. grandiflora* are prepared as food. The young tender pods are cooked similarly to other green beans in South Asia. The young leaves are chopped and sauted, perhaps with spices, onion or coconut milk. In the Philippines, unopened white flowers are a common vegetable steamed or cooked in soups and stews after the stems and the calyx have been removed. Selection of white flowered varieties that flower profusely has resulted from this use in the Philippines.

### Soil Improvement:

*S. grandiflora* is often main-



Bokful (*Sesbania Grandiflora*)

(flower, leaves, young pods), ornamental, nitrogen fixation, anti-erosion, windbreaks, soil improvement, fuel and charcoal, short fibre pulp, green manure, gum tannins etc. Some of the principal uses of this plant species are reported here.

### Fodder:

*Grandiflora* is valued as a fodder in many regions. The leaves contain as much as 25-30 per cent protein. Although ruminants readily consume *grandiflora* fodder and its di-

gestibility is high, some feeding studies have indicated that antinutritional factors are present. Until further research provides clear guidelines, caution should be used in feeding *S. grandiflora* to ruminants and other animals and restricting feeding to less than 30 per cent of dry matter intake is suggested. The leaves of this plant species is toxic to chicken and should not be fed to them and other monogastric animals.

### Wood:

The wood is rather light and is not ideal for firewood or pulping; the bark is thick and

### Culture and Management:

*Grandiflora* is grown from seed, which may be planted without scarification. Stored seeds lose viability within a year or two. Seeds may be directly sown or transplanted from nurseries; bare rooted transplants are usually successful. Seedling growth of *grandiflora* may be very rapid. Under harsh conditions or neglect, however, seedling survival may be poor. The leaf canopy is open and casts only light shade, hence its popularity in gardens.

*Grandiflora* can be coppiced or pollarded. Harvesting leaves for fodder must be done selectively to avoid complete defoliation and can not be done more than a few times per year. More intensive harvesting such as managing as a hedgerow reduces the life of the tree. Whole flowers and pods are harvested for consumption as vegetables, the structure of the tree is shaped by pruning so that the canopy remains low, within reach for convenient harvesting.

The writer is the Principal Scientific Officer of Institute of Food and Radiation Biology, Bangladesh Atomic Energy Commission.

# Remote Sensing Technology

by Basri Md H H

The writer is a member, of Bangladesh Association for the Advancement of Science (BAAS)

SINCE World War II Remote Sensing (data collection from a satellite or an aeroplane) techniques have been developed and proved of immense value in mapping and monitoring various resources of the earth. Aerial photography is the original form of remote sensing and remains the most widely used method. The development and deployment of manned and unmanned earth satellites began in the 1960s and provided an orbital vantage point for acquiring images of the earth. The unmanned airborne and spaceborne satellites orbiting around the earth are taking continuous images of it.

There are different satellites launched by different countries, such as American Landsat, NOAA, Seasat, SIR-A, SIR-B, SIR-C, France SPOT, Indian IRS-IR, Russian ALMAZ, Japanese JERS-1, European Space Agency's ERS-1, etc. Before it was thought that the aerial photos were the only available remote sensing data with detail information of the earth's terrain. But nowadays, satellite sensors are capable of acquiring much more informative and detail data of the earth's surface than that of aerial sensors.

The satellite images and aerial photos have a wide range of application for the study of environment and natural disaster, agriculture and forestry, water resources, coastal and marine resources, for soil and cadastral survey, petroleum and mineral exploration, urban planning, construction engineering purpose, and for many other disciplines. Remote sensing data are multidisciplinary and people of different disciplines can use the same data set from different point of view.

Any country having remote sensing receiving station, like SPARRSO (Space Research and Remote Sensing Organization) in Bangladesh, can receive satellite data. Besides, there are open markets throughout the world to purchase and sell remote sensing data without any restriction. Thus any country or even any person can get images of any terrain of the world.

dozens fruitful results with the help of remote sensing technology in exploration of natural resources and in the study of environment. In these countries, satellite images and aerial photos are available for scientists and planners to undertake research and to prepare maps for proper planning and development. Whereas, in our country these remote sensing data are still kept restricted by the government as highly classified data for unknown reasons. There are a few scientists in Bangladesh who are familiar with the application of remote sensing technology. A few of them have got their expertise on it sum abroad.

Most of the overseas universities have got remote sensing centres, where researchers of different scientific disciplines are working. Whereas in our universities this technology is not even included in the university course curriculum in related science departments. Thus this technology remains almost unfamiliar and under developed in Bangladesh. It is incredible that in our country, a lot of important organizations of research and earth resources like Bangladesh Agriculture Development Corporation (BADCO), Bangladesh Petroleum Exploration (BAPEX) Co. Ltd., River Research Institute,

Bangladesh Centre for Advance Studies, The Centre for Urban Studies (CUS), National Oceanographic and Maritime Institute (NOAMI), Delta Study Centre etc. do not have experts and facilities of using remote sensing technology where this technology should be very vital.

However, we must keep in mind that research in different scientific disciplines and proper planning are the prime conditions for our national development. Any kind of restriction on scientific research will make us unable to cope with the advancements of modern science and technology, and our dependence on foreign consultants and experts will be increased.

It is, therefore, understood that in the age of satellite, the aerial photos (remote sensing data) should not be classified and restricted data. Hence, it is urged to the proper authority to abolish the outmoded, unjustified and baleful law of restriction on aerial photos and to facilitate an easy access to the stuff for those who require them in research, teaching, and planning purpose. The concerned authority should do so to help proper planning and development in the related fields where remote sensing technology is applicable.



This is the kind of picture that appears on the radar screen of an aeroplane, and shows the estuary of the River Mersey. Courtesy — Wonder Book of Wonders

# Islamic Science Foundation A Drop of Ink Makes Million Think

NO Muslim country possesses a high level of scientific and technological competence. While the world economy is getting more and more global, the gap between the industrial countries and the Muslim communities continues to widen, and scientific and technological advances remain confined to the rich countries of the North.

The Islamic countries could make a decisive breakthrough by creating an Islamic Science Foundation. The Foundation would be sponsored by Muslim countries and operate within them. It would be non-political, purely scientific and run by eminent people of science and technology from the Muslim World.

The Foundation would have two principal objectives. First, to build up high-level scientific institutions, and personnel — strengthening existing communities of scientists and creating new ones where none currently exist. Second, to build up and strengthen international institutions for advanced scientific research, both pure and applied, relevant to the needs of Muslim countries, and with an emphasis on international standards of quality and attainment.

The Foundation would initially concentrate on five main areas:

- High-level training — Scholars would be sponsored abroad to acquire knowledge in areas where gaps exist in the Muslim countries. Some 3,000 would be supported annually with continued support for 1,000 after they return home — about 15% of the Foundation's budget.
- Enhancing research quality — Contracts will be awarded to university departments and research centres to strengthen their work in selected scientific fields — about 25% of the budget.
- Contact with the world scientific community — To promote the interchange of ideas and criticism on which science thrives, the Foundation will support 3,000 two-way visits of scholars and fellows, as well as the holding of international symposia and conferences — about 10% of the budget.
- Sponsoring applied research — To strengthen existing institutions and create new ones devoted to the problems of the Middle East and the Arab World — including health, technology, agriculture, environment and water resources — about 40% of the budget.
- Popularizing science — To help make the population of the Islamic countries more scientifically and technologically minded, by making use of the mass media, scientific museums, libraries and exhibitions. It would also help modernize science and technology syllabi, and award prizes for discoveries and inventions.

The Foundation would have its headquarters at the seat of the Islamic Conference and would be open to sponsorship by all its members. Its Board of Trustees would consist of representatives of governments, professors and scientists. It would also have an Executive Council of eminent scientists which would be free from political interference.

The Foundation would be a non-profit tax-free body, which as a non-governmental organization would build up links with the United Nations, UNESCO and the UN University system. It would have an endowment fund of at least \$5 billion and projected annual income of \$300 to \$350 million. It is envisaged that the sponsoring countries would pledge the endowment fund as a fixed proportion of export earnings and provide it in four annual instalments.

Creating such a Foundation should be an urgent priority for the Muslim World. It would enable Muslim societies to recapture their glorious heritage of scientific pre-eminence and to compete as equals in the world of tomorrow.

by Abdus Salam, winner of the 1979 Nobel Prize for Physics Courtesy — UNDP, Delhi

# Blood Transfusion Service in Bangladesh

by Dr Mujibur Rahman

OVER the past thirty years blood transfusion has become one of the essential components of medicine. The use of blood has become more wide spread with a concomitant need for new blood donors.

There have been immense developments in blood transfusion from the systemic determination of Rhesus factors to the screening for antibodies, from transfusion of whole blood to transfusion of blood components, from determination of erythrocyte subgroups (red cells) to leucocyte groups (white cells) thus facilitating organ transplant and finally, from manual laboratory to automation.

The organization of blood transfusion services developed immensely and covers the entire country. Blood transfusion differs from all other medical activities and therapy in that it concerns not only doctors and patients but healthy adult population who are the blood donors.

The tremendous growth in this science which embraces portion of human genetics, clinical pathology, anthropology and forensic medicine etc has been due to recognition of the great value of blood transfusion to the seriously ill patient. In spite of the importance of the subject it is yet to be established as a promising career discipline for the medical graduates.

Traditionally, there has been a lack of recognition as speciality by the clinicians despite its role as a special subject in medical science.

The first and lone Blood Bank in the country, now Bangladesh was established in 1950 by Late Alhaj Dr Atabuddin with technicians and doctors who were not trained in this area. He was also one of the medical officer in "Red Cross Blood Bank" which was established in 1939 and located in the school of Tropical Medicine in Calcutta.

The activities of the department were limited and handicapped due to lack of trained personnel. Some external trainings were received by a handful of physicians although the scope for career progression in service continued to remain limited unlike other medical disciplines.

After my return from the United Kingdom with PhD in the field of blood transfusion in 1967, I was posted as Blood Transfusion Officer, (in the same rank and status of Associate Professor) in charge of the department of Blood Transfusion in Dhaka Medical College Hospital. Towards the

second half of the 60's importance of blood transfusion as a professional discipline began to grow with special emphasis on:

- i) the improvement of blood transfusion services and upgrading the status of Blood Transfusion Officer to faculty positions like other discipline such as Professor of Surgery and Medicine etc.
- ii) establishment of a distinct specialist cadre for the blood transfusion workers.
- iii) increase in the numbers of trained doctors and technicians within the country through in service and external training; and
- iv) equipping the existing centres and to increase the motivation of blood donors.

This is presently the only Blood Transfusion Centre in the country as a self contained unit. Apart from routine and research work, the centre has been undertaking and assisting in teaching blood transfusion techniques to medical graduates and Post-graduate students leading to diploma in Blood Group Serology and Transfusion (DBS & T) under the University of Dhaka since 1972, to overcome the present shortage of specialist in blood transfusion who are urgently needed in medical colleges, district hospitals and Upazila Health Complex.

The course of diploma (DBS&T) is one year and is offered in the Institute of Post-graduate Medicine and Research. Students of all categories of different post-graduate subjects including DBS&T have to appear for admission test both in written and oral examinations conducted by the Board of Examiners.

Doctors already having diploma in blood transfusion were placed as Assistant Professor, Associate Professor and Professor of Blood Transfusion in different medical colleges and Institute of Post-graduate Medicine & Research in collaboration with WHO.

The subject of blood transfusion as an academic discipline and professional undertaking has evolved into a sustainable state. The full functioning of the services with modern techniques and motivational efforts are however yet to achieve a level of high satisfaction and standard, efforts for which are continuously underway through concerted initiatives of the government and other non-governmental philanthropic organizations.

Now a days more than 50 per cent of the young doctors of the country are equipped with basic knowledge about this subject. Arrangements are at hand to train the Clinical Pathologist as well as young doctors from the country at Central Blood Transfusion Service at Institute of Post-graduate Medicine & Research. Regular training on blood transfusion are being imparted to the paramedics from various parts of the country at Institute of Post-graduate Medicine & Research in collaboration with WHO.

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and holder of degrees. Blood Transfusion Centres were opened in phases at all the medical college hospitals as well as in specialised hospitals in the country. Many of the district hospitals have their own Blood Transfusion Centres in the country. Blood Bank has been functioning at the Institute of Armed Force Pathology & Transfusion.

Bangladesh Red Crescent Society started its blood collection programme at Moham-madpur, Dhaka on the 8th May, 1981. Initially the programme was technically organized by me and the staff of the Central Blood Transfusion Service of Institute of Post-graduate Medicine & Research. At present the Society is manned by its own staff and received technical assistance from the Japanese Red-Cross Society. The organization of Blood Transfusion Service is indeed a major endeavour of Red Cross movement. At present there are 48 blood transfusion centres in the country.

Sondhani, a medical student organization of Bangladesh is doing laudable job by recruiting voluntary non-remunerated blood donors for the different blood transfusion centres in the country.

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