INTERMEDIATE TECHNOLOGY

• E. F. Schumacher

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One of my activities sails under the name of intermediate technology. It began nearly twenty years ago, when, for the first time, I got a short-term assignment to advise the Prime Minister of Burma on his country's development policies.

What I saw in Burma I did not like. Burma was running itself into the ground trying to modernize in a hurry, primarily on the basis of the rich man's technology. At the time I could not think my way through it, but I just felt that unless Burma remained Burma, it was going to become a nothingness. With the exception of some mainly immigrant Indians in Rangoon, the people in Burma were very well fed, beautifully dressed, living in delightful houses built precisely to suit the climate, and appeared to be the jolliest people one could ever meet. Something did not fit.

It was not until a few years later when the Prime Minister of India asked me to come to India and consult with him on the rural areas, and only after I had traveled the whole of the country, that something clicked in my mind; namely, that for developing countries, there is, on the one hand, a very low level of technology which does not keep people going except in relative misery, and, on the other, the rich man's high-level technology which is outside their reach.

Of course, high-level technology can be implemented at this or that point in developing countries, but the points tend to be the big cities. That technology cannot eradicate the three-fold disease of mass migration into cities, followed by mass unemployment, and finally the threat or actuality of mass hunger, because, in the end, food is produced not on balconies in the cities but in the vast rural areas. In India, development efforts were bypassing the rural areas, where eighty-five per cent of the people live, thus exacerbating this three-fold disease, making the problems larger and more unmanageable.

Between low-level technology and high-level technology, there is a great vacuum which must be filled with what I have called intermediate technology. But I received a very bad reception when I got back to Delhi and talked about intermediate technology. I was accused of being an imperialist, a fascist, a racist, a beast who had come to India to keep the country down and to withhold —as if I could withhold anything—the glories of modern technology. I got angry and said, "Well, bye-bye." If you ask the doctor to come, and he gives you good advice, and you abuse the doctor, the doctor leaves. Still, you never know what will happen.

Fifteen months later, there was an all-India conference on intermediate technology, and a leading Indian economist said, "This is what we must attend to."

So, for a number of years I have been talking and thinking and lecturing about intermediate technology. Then comes the awful moment—with some people this moment never comes—when you ask yourself, or your friends say, "Are we only talkers or are we doers?" But what can one do? Talking and giving lectures is not illegitimate, but if one wants to do something one sets up an organization.

We set up an organization, and we called it the Intermediate Technology Development Group, Limited. It's still very limited. I happened to have earned an inordinately high fee from an article published in **The Observer**. I used that hundred pounds to start the organization. Many people — particularly young people — think that before you start anything you must have a lot of money. We started with an idea and without money.

That was in 1964. Now, the Intermediate Technology Development Group involves more than a thousand people.

Needless to say, I do not have a thousand people on my payroll. I've got thirty people on the payroll, and to raise the money for that is difficult enough. But we have adopted, quite consciously, a decentralized mode of operation. We said to ourselves from the start: we can't build up technological workshops (that is vastly expensive), but plenty of technological workshops already exist. We must get them to work for us.

This has worked; it has worked magnificently, not only with academic institutions, but also with industry. Virtually all the work, except for that of the over-all direction, which must be done from the headquarters, is performed by other people on their own behalf, if I may put it that way, but for us.

Our first thought was, how can we start? We hit on an idea that some people in California in a quite different context also hit upon when they produced the **Whole Earth Catalogue**. Cataloguing is always a good idea for starting. We said, we'll make a catalogue, suitable for the rural areas of the world, of small-scale equipment that is still available from British industry. We confined ourselves to British industry because we had no money to travel. We could reach British organizations from London without having to travel.

We got the Association of Agricultural Engineers to do the cataloguing on agricultural equipment, and various other associations to catalogue other equipment. We compiled this catalogue without money. Indeed, people who wanted to get into the catalogue had to pay us.

We called the catalogue **Tools for Progress: A Guide to Small-Scale Equipment for Rural Development.** The catalogue itself was a tool. It helped the poor find equipment relevant to their problems. Once you are out in the bush, you cannot find anything. **Tools for Progress** traveled the world. It even became economically self-supporting. It is now sold out. When we looked at it again, we found it was too superficial, so we decided to take problems up, subject by subject, as the winds blew and as opportunities arose.

We set up voluntary specialized panels to advise us. The first subject we tackled was building. There can't be any development unless there is some building. Why don't people get on with their building, let's say, in Africa? There are architects, surveyors, and civil engineers in Africa, and, at a lower level, there are bricklayers, electricians, plumbers, carpenters. Still, most of the people remain unemployed in Africa, or else they try to find a job with a foreign contractor. Our advisory panel on building said that the missing factor in this situation is the building contractor. We decided to train indigenous contractors.

We started in Nigeria, and developed a great stock of teaching material. We found, in fact that the contractor is the forgotten man in Nigeria. When we discovered him he was delighted, delightful, and eminently teachable. These courses have been put on throughout the country without the aid of the government. They have been very successful, and the teaching materials have been verified.

Once we have produced the knowledge of how to do something, we let the knowledge roll, by the laws of gravity. The Nigerian courses have leapfrogged to Kenya, to Tanzania, to Zambia, and other countries. The materials are freely available, although they are not free of charge because it costs some money to produce them. Then we leave it alone, because that particular knowledge gap has been filled. We are not an aid organization in the conventional sense, but a knowledge organization.

Now, the building panel has advised us to give attention to local building materials and upgrade both the materials and their use. We are doing that work in conjunction with the engineering department of Cambridge University in England. That is a central part of our whole organizational idea: to use facilities that already exist, rather than duplicating them.

All our advisory panels are built on what we call the ABC combination. A is for administrators, people from government. They know how to pull the ropes. You have to have them on your side, or they may stop you. But they can't do it alone. A governmental development policy is ineffectual because civil servants do not live a life that produces the particular abilities needed to make a thing viable. For that you must have businessmen with you. That's the B factor. It is not difficult to find highly enlightened and generous businessmen. But the businessmen can't do it alone either; they are under their own constraints. We need communicators, the people of the word, the academics, and research people. That's the C factor. None of the three groups can do it alone, but bring them together and you will get a synergic effort.

It is also an enjoyable experience for all three groups. A normally has a rather poor opinion of B and C; B feels the same about A and C; and C has a poor opinion of the other two. But when they meet, they discover that actually they are all quite able and decent people.

Our second advisory panel was on water. Here again was exemplified our ideology of intermediate technology. The good Lord sends water to most places where it is wanted. But in arid countries the water runs away into rivers and out to sea. Modern intelligence suggests the building of a desalination plant. But even if you get the money for it, and even if it is built, it is monstrously expensive and energy-consuming, and you still have it in only one place, when what is wanted is water throughout the country.

So we developed various small-scale technologies to hold the water where it is wanted (particularly for human requirements) and where it has to be protected. This meant underground water catchment tanks. We adjusted the technology to the level of the poor; in economic terms that means that outgoing expenditures to build the tanks must be minimal, ideally zero. The labor content can be what it has to be, because there are a lot of workers who for a long stretch of time during the year have nothing to do. These tanks can be built by the villagers. The expenditure is minimal; it is the price of, say, one cow

Small tower is the oven in which pottery pieces are baked.
PHOTO: UNESCO/P. Almasy

for a twenty-thousand-gallon tank.

In this case, funded by an aid organization, Oxfam, we demonstrated these tanks in Botswana. The Botswana government told us that having water where it is wanted had changed their entire prospect. They asked us to train the villagers. We said we do not train the villagers. If we train them they come into a European environment and will not return to the villages. They will become government clerks. But we are prepared to train the primary school-teachers from the village, because they have enough motivation to go back into the village. And with that knowledge these teachers, at least to start with, can build rainwater catchment tanks for their schools.

The water panel advised us not only on these catchment tanks, but on all problems of water lifting, and water in and water out. We also recommended that the dimensions of the tank be such that there would be enough water for all human requirements and something to spare for micro-irrigation of horticulture as practiced in Israel. Then the whole thing was fully documented, we produced a handbook on self-help water and sewage technology, and that was the end of our activity.

This is now usable knowledge. As I say, knowledge follows the law of gravity. Knowledge is free. It travels across frontiers. There is no customs duty on it. I was recently in quite a different part of Africa and I found these catchment tanks being built there. They are also being built on a large scale in Jamaica, and in other non-African states.

A third advisory panel deals with agricultural equipment. Here again, technology has zoomed out of reach of the poor. British tractors—and no doubt even more so in the United States—are such complex artifacts that the British farmer cannot risk letting volunteer workers run them. They can't even let engineering graduates on the tractor. If you push the wrong gear on a twenty-four gear tractor, the owner is between five hundred and a thousand pounds out of pocket. In poor rural areas the question is whether a tractor is in every case necessary.

So we studied the whole range of agricultural equipment from the point of view of poverty. We couldn't do it ourselves, so we approached the National College of Agricultural Engineering, in Bedfordshire. They were delighted. They wanted ideas for their students to work on. Their intermediate technology unit first made a worldwide search for low-cost simple equipment that can be locally fabricated. They came up with seventy such items of equipment and we published this information. This is down-to-earth knowledge. We give the chap who feels he needs a particular item the drawings so that he can fabricate it himself. To him it is immensely exciting to discover he can do certain things so much better than he had ever done them before.

Unfortunately, the mainstream of technological development is using this fabricating knowledge to make things bigger and more complex. We try to use this intelligence to make things smaller and simpler. For example, we were up against the problem of metal bending: how to get the metal around the wooden wheel of an ox-cart. That is no problem in Pittsburgh or Sheffield, but how do you do it in a small town in Africa, or in India? Well, our forefathers knew how to do it. They had a most intelligent tool, but it had fallen into oblivion. We discovered one of these tools in a French Village, and we took it to the National College for Agricultural Engineering and asked them to upgrade it, put modern mathematics into it, and get the curvature just right.

The upshot is that this tool has now been redesigned. Any village blacksmith can make it and do the job perfectly. The cheapest modern equipment that we could locate anywhere in the world to do this job costs seven hundred pounds and requires an electric drive. Ours costs seven pounds and works with human power. It is a symbol of what is now possible, namely reducing the capital cost of a piece of basic agricultural equipment by the factor of a hundred—from seven hundred down to seven—and at the same time doing away with a need for electricity, because in most of these places there is no electricity.

We have fifteen advisory panels in all—on cooperatives (why do they so easily fail, for instance?); on rural health (that has been effective, but it's never been fund-

ed, so we have never been able to get full-time people on it); on wood and woodworking; on transport.

Our developed societies have engaged in aid studies for more than twenty years, but the poor are still as poor now as they were before. There are specific needs arising out of situations, but the situations have to be understood. Our Intermediate Technology Development Group does not touch agriculture from an agricultural-science point of view. We touch only the outgrowth of agriculture.

We do not reject anything in another people's culture. We carve out for ourselves work that responds to need, a need which may not be immediately and spontaneously recognized everywhere by the people themselves, but that, with a little bit of to-ing and fro-ing, is eventually recognized by them; and then they ask for it.

What we do first is find out the work-load pattern of the specific community over twelve months. This reveals a characteristic curve. Anyone can see that for some time nobody has anything to do: the village is idle. Then comes the month when everybody is out in the fields—men, women, grandpa, grandma, and babies. After that, there is nothing much to do, and then comes another little peak. The characteristic curve varies from place to place, particularly when there is double cropping. We say that unless we can break through at the peak of the curve with some mechanical help, you are stuck. This determines what sort of equipment is actually needed.

People immediately understand this. It presents no problem. There is no cultural gap, once you have discovered a people's real needs and helped them to understand those needs. We do not have money, so we cannot foist our ideas and knowledge on them. Until they ask for help, we cannot do anything.

If the Pakistanis tell us they need a super, super thing, we say, "Well, then, for that you don't need us." But they may say, "Our electricity grids will not reach the northern province, not in the lifetime of anyone now alive. They are left without any power. What can we do? We have falling water coming out of the Himalayas. No big sites, but lots of little streams. Could you help us to get mini-turbines to harness this water power?"

At that point, we survey the field, hand it over to our power panel, which comes back and tells us, "As far as Britain is concerned, there is only one man who makes mini-turbines. He makes them as a hobby. The design of this turbine hasn't been looked at since 1902."

We can do things better in 1974, so we take this to the engineering department in Reading University where it becomes a student project. We say, "Can't we make it at half the weight and with a simplified design so that Pakistanis can make it themselves?"

We encounter no cultural gap in Pakistan on that. We have no sociological problem. The Pakistanis already know what they need.

Of course, there is more to it than that. The turbine by itself is not enough. You must have the use of that electricity. I am talking of mini; I am talking not of four hundred megawatts, but forty, fifty, two hundred kilowatts.

For developing countries there is, on the one hand, a very low level of technology which does not keep people going except in relative misery, and on the other, the rich man's high-level technology which is outside their reach.

That is better than nothing. It takes a few wires and at the end of the wires some busy Pakistani can make something.

We had a situation in Zambia where the egg producers were in despair because the supply of packaging material had given out. We said, "Why can't you make egg trays in Zambia?" Nobody in Zambia knew.

Back in London we found that with very few exceptions all the egg trays in the world are made by one multinational company, headquartered in Copenhagen. We contacted them. They said, "No problem, we will build a factory in Lusaka. If you raise the money by aid, so much the better; we know we will get paid. How many do you want?"

We said, "It's a small, widely dispersed population. They need every year about a million egg trays each holding thirty-six eggs."

Long pause. They said "Forget it. The smallest machine which costs a quarter of a million pounds, will make a million a month.

Obviously that is not for Zambia. It's not for development. We asked, "Why don't you make a small machine?"

"Oh, we talked to our engineers, that would be uneconomic."

We take things at that point where everybody says it is uneconomic. We got a young fellow and gave him two jobs. First we asked him to redesign the egg tray which we didn't think was of a good design anyway. We wanted trays that one can fill with eggs and put one on top of the other, stringing them together and shipping them like that, without crating, because crating is very expensive. These countries do not have a lot of timber.

That problem was taken to the Royal School of Arts in London. Within six weeks, we had the perfect design, one far better than that of the multinational company in Denmark. We patented it.

The second job we gave this young man was to set up a small production unit to make these trays. The prototype was produced at the University of Reading. We took the prototype to a manufacturer in Scotland and it is now on sale and has been installed in quite a number of African countries. We have inquiries about this unit from all over the world, including advanced countries. It has two per cent of the capacity of the hither-

to smallest unit so it fits into situations where nothing now available fits. And it costs two per cent of the hitherto cheapest model. So, in fact, if I may use the economists' jargon, the capital output ratio is just as good in the small scale, the one thing that no engineer would believe and most economists will not believe. But it is there.

Now, this was handed over to one of our subsidiaries, and today we have a lusty sale of this machine, simply because it meets actual recognized needs.

Here is another example. In malawi, an aid mission went to the farmers in a particular district and said, "We can show you methods that will double your yield." The farmers were most interested, because they knew that they were poor. It all worked very successfully. They doubled their yield. A year later, the aid people returned and found that the farmers had reverted to their previous methods. The aid people were disappointed. They went back to their own country and criticized these farmers, talked about their cultural gap and all the rest.

We happened to be in Malawi, and we were asked to have a look. We did not asume that these people were stupid. We found the answer, namely, that they had been subsistence farmers and consumed everything they produced. Now that they had produced twice as much, this extra crop had to be taken to market. But there were no means of transport, except the beast of burden in Africa, the woman. The women carried the extra food to market in baskets on their heads, walking for miles and miles. They did it for one season, but they said, "Never again." The wise old farmers said, "It is more important to keep our women happy than to treat them as slaves. Our old system was better."

At that point, we got involved. We said "Look, you can have double yields, and you can get the stuff to market. Our transport panel will show you how to do it."

We brought to Malawi a very simple oxcart design from Scotland. We organized a scrap dealer to produce the few metal parts from an inexhaustible source of material in Africa, namely, wrecked motor cars. We devised a little do-it-yourself kit for the metal parts. We trained local carpenters to make oxcarts, and told them that if they completed the course, we would give each of them one of these kits. They could then go home and make oxcarts that they could sell at a price enabling them to buy more of these kits. They would be in business if they wanted to be. Once they had the oxcart, their problems disappeared.

One more example. The Pakistanis were desperate for increased brick production. They went to the World Bank and got a loan. Then they got an expert, an absolutely first-class retired brickmaker. He said, "I'll give you the design for a super brickworks. The only possible location for it is just outside Karachi. It has the best clay in the world. It will cost five million pounds, it will produce a million bricks a week, and it will give 150 jobs."

But this does not fit Pakistan. The country is littered with brickworks to which no one has ever given any attention. The government decided not to build a super brickworks.

Tubewell powered by electricity furnishes water for irrigation, washing and bathing.

PHOTO: Marc and Evelyn Bernheim

We advised an intermediate-technology approach to these derelict, highly inefficient local brickworks. I took a young brickworks specialist with me, and we walked through them. He said, "There's no problem, I suggest this, and this, and this. We can increase productivity by a factor of three, with no loss of jobs, no investment worth talking about, and you will get three times as many bricks as before." This is precisely what the Pakistanis wanted.

To give this kind of help, you need people who can break away from an experience formed by life in rich countries where there is plenty of capital, where the main thrust is labor saving, and where they take for granted an infrastructure of roads and transports for the distribution of, say, a million bricks.

Two of our quasi-separate units are of a special kind. One is the industrial liaison unit, which is in touch with about five hundred firms in Britain representing two

hundred branches of industry. This enables us to take our problems to industry. Of course, industry does not work for love, but we can now talk to them and say, if you can hit this off, there may be music in it for you, it may be profitable. We have learned that adaptations can be done best by industry, not in research establishments. We know the manufacturers who can produce the implements we want to put into the world.

Britain's Ministry for Overseas Development has now funded our industrial liaison unit. That ministry cannot do the job except with industry, but for government to cooperate with industry is extremely difficult. Government cannot create precedents; if it works with one firm, then it must be open to work with all other firms. But public moneys are not adequate for this kind of work. So the Ministry for Overseas Development has funded us and brings its industrial problems to us. We can then do with industry what needs to be done.

Our second special unit is the university liaison unit. That is a bit of a misnomer, because it includes not just universities but technical colleges, polytechnics, and so on. We farm out to these institutions student projects in which the subject matter seems to be interesting, but which we cannot take to industry because it is not right.

Before you take anything to industry, it must be right. For example, on these underground rainwater catchment tanks the building material is very labor intensive. In many developing countries there is that black, nasty substance, refinery residues, bitumen. It is used on roads. Wouldn't that stuff make a good bottom for the rainwater catchment? It turns out it has to be reinforced in some way. The immediate answer is, yes, you can reinforce it with glass fiber. But glass fiber costs six hundred dollars a ton. So we said, why not natural fiber? In Tanzania they are drowning in sisal. Couldn't sisal be used for reinforcement? Well, nobody had ever studied that. So we got this researched with all the paraphernalia of a scientific study at the Imperial College of Science and Technology. We know what can and cannot be done with natural fibers, although it is not immediately clear where to go from here. But at least we can talk to industry and ask them how one can bring this to the prototype stage.

Our industry and university liaison units are in touch with a score of research institutions in Britain, and we have launched about two hundred such student projects, some of them absolutely fascinating.

We are left with a problem. After working up this knowledge, how do we get it across? We cannot communicate with lots of different people in each developing country—we are now working in two dozen such countries. They need a focal point. We have been trying to get each of them to set up an intermediate technology group. So far, eight developing countries have such groups.

We have also urged similar groups to start up in developed countries. An intermediate technology group was founded in Switzerland last year at the Duttweiler Institute. Others have started in Sweden and the Netherlands This means that in our search for suitable equipment or techniques, we are not restricted to Britain. The Germans wanted to set up an institute, but they started out too big, and so they were shot down; but they are trying again. In the United States our main link is with VITA, the Volunteers for International Technical Assistance.

We have less organized connections with other countries, but the units in the developing countries are the most important. In any case, gradually an international network has come into being, through which the knowledge can flow. To promote this flow, we have started an international journal called **Appropriate Technology.** It does not simply report on the splendors of our own work. Its pages are open. We want to provide information of what is being done, by whom, where, and in what line.

We are not primarily interested in disquisitions on how difficult a problem is, but rather instructions on what one can actually do for oneself. We are trying to answer this most difficult question: How do you get knowledge that has been worked out in London to the two million villages that might need it?

Another large problem is how to finance something like this. It is not difficult to finance our overseas projects, which are launched not primarily to help these particular people, but to verify the knowledge, train the people, and to prove that it is both meaningful and socially acceptable. That is easy to finance. What is extremely hard to finance is the thinking work at headquarters.

To do that, we have created four subsidiaries to our main organization, the Intermediate Technology Development Group, Limited, which is registered as a charity. The four wholly shared subsidiaries are commercial organizations. The first is a consultancy bureau. When a request comes from Tanzania, if they will pay my expenses, I will go to Tanzania free of charge. But when a request comes from an oil-rich country, it would be stupid and, from an over-all economic view, not even very helpful, to refuse to make them pay for the help. They don't miss the money, and it helps to solve certain balance-of-payment problems.

The second subsidiary is a trading company which sells our designs, machines, implements like the metal-bending machine, and also more ambitious machines; and that is also profitable.

The third subsidiary is a retail shop in London. People in developing countries produce all sorts of things for sale in the advanced countries, but they know very little about marketing. The best way to help is to have a shop where they can learn it by doing. This shop is called Afro Arts, Limited. It is very attractive. The shop sells their products at horrifying prices to people who have too much money. The profits flow into our research work.

The fourth subsidiary is Intermediate Technology Publications, Limited, We now have a long publications list with a high commercial turnover. Currently, we sell about five hundred pounds worth of our literature a week. This is chicken feed in big-business terms. But is very specialized material and very inexpensively produced and is designed for the poor. This has to be commercially managed, so we turned our publications department into

An Oxcart wheel — how to make it?
Photo: CRS

any, the same company that has launched our That means that some of the sharp edge of com- discipline is introduced into it.
profits of these subsidiaries help to run the head- organization.
oncluding note: when one says that people in de- countries are not stupid, one does not imply that in developed societies are stupid. Everybody is nt in the things he knows and has experienced. I say is, "Let us take the people in developing countries more seriously, and let us not imagine that our experience fits their case." Those people are intelligent. They know how to live on virtually nothing. We are intelligent and know how to live in a society where all the high-technology presuppositions are fulfilled. But it takes a mighty effort to jump out of our own experience and put ourselves inside the experience of these people. There we may be stupid, as stupid as a most intelligent farmer might turn out to be the moment he has to cope with our technology.

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lion dollars in Thailand since an attempt to establish the as a "keystone" for carry- various military strategies d to preserve the U.S. role cific power.
iations between the U.S. and d have been attended by ated and contradicting fac- n the one hand, the revolu- s' victory in Indochina imposes new restrictions and necessitates substantial changes in the military/security relationships be- the 2 countries. Moreover, the U.S. is facing severe economic problems at home and substantial congressional cuts in the aid request for Thailand. In addition, Washington has been uncertain what course the new civilian government in Bangkok will take. The new political realities in Indochina obliged the reigning powers to say that the US must remove its military presence within a year. On the other hand, the powerful vested interests, dependent on American presence, have developed among military and political leaders during the long years of massive American involvement. Thus, sources say, members of government privately want less than a total pull-out.

— *A digest from "Thailand in a Changing Asia" Indochina Chronicle (May-June 75) by Praxis.*

THREE VILLAGES IN NEPAL

• NEDD WILLARD

Reprinted from WORLD HEALTH

The road leading out of Pokhara is paved at first but soon stops at a dry gully where we left the Landrover. Then it was a footpath all the way to the first village. There were three of us, Mr Tulli, of the Local Development Department (LDD), Gordon from UNICEF and myself, all off to see how far the rural water supply scheme had progressed in these mountains near Pokhara.

It was after two in the afternoon and the walking wasn't too hard yet though everyone began to sweat as the path began curling up the flanks of a bare mountain. Where the mountain folded back, and there were trees and fern growing in abundance, the air was cooler. Aruna was three hours' walk away.

"Here is the first tap," announced Mr. Tulli with pride. A solitary tap in a board cement basin stood under a large tree.

"But where is the water?" I asked.

"We will ask the local farmer. We are staying at his house for the night anyway."

After a short, steep climb of steps, made from large slabs of grey stone, we reached the farmhouse. It was long and low with a sturdy thatched roof and windows outlined in dark wood. There was an open space on top where we would sleep tonight.

The farmer was off celebrating somewhere, so it was his hired hand who took us on a tour of the water system in Aruna. The stone steps ran steeply to the top of the first crest and then leapt down again. Further on, another concrete emplacement, with another lonely tap, was waiting for us.

"Where is the water?"

"Oh, it doesn't run every day. Sometimes it comes on for an hour or two." We were all unhappy at this. After all, who in the village could tell when the water would be on and be able to profit by it? By the time we reached the third tap, which was only a piece of plastic pipe held upright by a stout plank, we were getting suspicious as well as unhappy. No water came from the tap and a little digging showed that it was not connected to the two taps we had seen earlier. No water would ever go through that line, even on the odd hours it chose to flow.

An old woman was watching us from a nearby field where she had tethered her goats. Slyly, she had made their tethers just long enough to allow them to browse in her neighbor's rice field.

We called to her, "Tell us, when did you see water here for the last time?"

"Oh, about a month ago, I can't be sure, maybe a few months ago." We all looked at each other and quickly reached an agreement. We would trace the water line back, either to its source, or to the first place where it was giving water.

We followed the path around the shallow terraced fields past one dry tap after another until we came to the school. This was a large low building, now covered with bunting as a minister or some other high official was expected.

"Is there a water tap here?"

"Not yet," said the hired hand, "but you can ask the Pradhan Panch (President of Village Council). He is in charge of everything in the village."

The Pardhan in his best suit was not too glad to see us even less so when we told him why we had come. At first, his answer to all our questions consisted of a litany on cement: "If only we had more cement, we could do the job." But when we insisted about the dry taps, most of them enthroned in cement bases but giving no water, he mumbled something about lack of repairs.

"Is there water at the collection point?" Gordon asked.

"Oh yes, that is working fine."

"Then take us back along the line until we find a place where water is running," we insisted. Reluctantly, especially since the minister or his deputy was due to arrive soon, the local mayor agreed to accompany us.

There was a bright sound of water splashing and then we saw the fountain. Water was rushing out of the pipe, overrunning the concrete basin and losing itself in gurgling streams that ran down the hill through the rice paddies. A woman arrived to fill her brass jugs with water. This tap was certainly working well. The mayor beamed.

He beamed less when we traced the line forward and found that the plastic pipe had been dug out of the ground, broken off and its end twisted shut. No one further down the line was going to get any of that water now splashing wantonly over the hillside a few feet further back.

"We lack tools. And skilled men to use them," moaned the headman.

"What happened to the taps we gave you to close off the pipes so as not to waste water, and the tools to work on the pipes?" Tulli demanded angrily .

"We never got them."

Tulli made extensive notes on the working of this water scheme in order to check the facts on his return to Pokhara and then we made our tired way back to the farm to sleep. We left the mayor glad to see us go but worried that we might come back or write an unkind re-