The Indians gathering at Altimira perform a welcoming dance. But they have warned that construction of a series of dams on the Xingu will effectively mean war. (Photo: N.Hildyard)

Adios Amazonia?

A Report from the Altimira Gathering

The destruction of Amazonia and its peoples recently received international coverage when Indians and environmentalists from all over Brazil gathered at Altimira to protest against the massive Xingu Hydroelectric Project. ***Nicholas Hildyard*** *reports from the gathering on the devastation of the forests, and argues that the forces of destruction cannot be halted within a market economy geared to satisfying increased consumer demand*

The Indians sat motionless on the concrete floor, as they had done for almost two hours, listening patiently as José Antonio Muniz Lopes, the chief engineer of Brazil's electricity conglomerate Eletronorte, smoothly outlined his case for building a massive hydroelectric scheme on the Xingu river. "The dams will be in your interests. Nor is it certain that they will even go ahead: they are still very much in the planning stage. We still have many studies to complete, and only when they are finished will we make the decision whether or not to proceed with the project. But if they do, they will bring progress."

The 600 Indians rose as one, raising their arrows and clubs in protest and chanting their disapproval. A woman, streaked in warpaint, strode to the dais, brandishing a machette and cutting the air to emphasize her points. Just inches away from Muniz, she brought down the machette in a graceful but swift arc, stopping the blade a hair's breadth from his shoulder blade. Muniz sat impassively as she ritually pressed the flat of the blade against his cheeks.

"You are a liar. We don't need electricity. Electricity won't give us food. We need the rivers to flow freely: our future depends on it. We need our forests to hunt and gather in. We don't want your dam. Everything you tell us is a lie."

The tension was palpable. Around the edge of the hall, the small detachment of military police, who had been called in after shots were fired near where the Indians were encamped, fingered their holsters. A few Indian warriors, wary of possible violence, deftly placed their arrows in their bows. For a moment it looked as if the worst was about to happen.

Muniz continued. "The dam project will only flood a small amount of Indian land. At most, 216 people will have to be resettled. It is a small price to pay for the economic benefits which will come to the region."

But the Indians would have none of it. "You say you're conducting exhaustive studies, but you haven't asked us what we think. In ten years time, you might come and ask us our opinion, but in ten years time, there will be no Indians left. All you think about is economics. You don't think about us." "We are not here for show. We are not just dressed up for the cameras. We don't want this dam and we won't have this dam. You say you'll conduct more studies, but you don't need any more studies. The dam will be a disaster: you only have to look at the others you have built." "The government is out to integrate us. But how will that help us? Look at this town: it's a miserable place. Conditions are terrible, and the people live a miserable life. Is this what you are offering us? Is this progress? Why don't you spend your money to improve conditions here. When will you finally *learn* that your dams don't help anyone but the rich? Why won't you *listen* to us? We have been here for thousands of years. We'll teach you how to live *properly*." "Don't talk to us about relieving our 'poverty'. We are not poor. We are the richest people in Brazil. We are not wretched. We are Indians."

A Gaviao chief, himself uprooted by a dam elsewhere in the Amazon, warned that Eletronorte could never be trusted. "They said they would compensate us, but Eletronorte blocked our claim in court. We

have not received one single cruzado. Eletronorte says they have paid us, but they haven't. Don't enter into any agreement with them. You cannot trust them. They say they are only conducting studies. They told us that. But with each study, they sealed our fate. Little by little, they moved in. Then the dam was built."

Muniz shook his head. But there was no doubting the mood of the Indians. "You've chosen to call your dam 'Karará'. Do you know what that means in Kayapo? It means 'War'. And war is what you will have if you go ahead with the dam."

The Xingu Dams

The Indians — some 1,000 in all — had gathered at Altimira, a boom town in north-eastern Amazonia, to alert world opinion to the ecological and social devastation that will result from the Xingu hydroelectric project, itself only the first phase of Brazil's ambitious *2010 Plan*. They had come from all over Amazonia, some by boat, others by bus, and still others by foot. All told, 36 sub-groups from 26 nations, many of them putting aside ancient differences, were represented in what was the largest ever gathering of Indians in modern times.

Under the *2010 Plan*,136 dams are planned for the whole of Brazil, 68 of them directly affecting Indian lands in the Amazon, and 6 of them on the Xingu or its tributary the Iriri. If all the dams get the go ahead, a minimum of 25,994 square kilometres (km²) — an area one and a quarter times the size of Wales — will be flooded, although some experts argue that the topographical survey work is so inadequate that the total area could reach 250,000 km², equal to an area the size of Great Britain. Much of the land to be flooded in Amazonia is pristine forest, and includes several Pleistocene 'refugia' (areas which survived the last Ice Age), all of which are centres of high biological diversity and species endemism, containing plants and animals that exist nowhere else on earth. Some 500,000 people, the majority of them Indians, squatters, goldminers and poor peasants, will be forcibly removed to make way for the dams. According to the Commissario Pro Indio, a Sao Paulo-based indigenous rights group, 60 per cent of the projects will affect Indian lands. Already 56,000 people are scheduled for resettlement to make way for projects currently under construction.

The Xingu River Basin Hydroelectric Project is one of the more ambitious sched-

Thirty-six Indian sub-groups from twenty-six nations, many of them putting aside ancient differences, were represented in what was the largest ever gathering of Indians in modern times. (Photo: N. Hildyard)

uled under the *2010 Plan*. It is intended to tap the exceptional hydroelectric potential of the Xingu and its tributaries. Approximately 70 per cent of that potential lies on the 'Great Bend' of the Xingu, a 170 kilometre stretch between Altimira and Bel Monte, where the river drops some 90 metres in a cascade of rapids. It is here that the first dam, Karará (now hastily renamed Bel Monte to appease the Indians), will be built. CNEC, the Brazilian National Consortium of Engineering Consultants, which has undertaken the survey work for Eletronorte, estimates that the dam will flood 615 km², but official predictions of reservoir sizes have been notoriously unreliable — at Tucurui, on the Tocantins river, for example, the reservoir was expected to cover 1,600 km²: it eventually flooded 2,600 km². The figure for Karará has been widely criticized by independent researchers, who put the minimum area of the dam's reservoir at 1,125 km². In addition, further land will be lost to the auxiliary pump stations, the construction roads and to the new shanty towns that will spring up as an expected 50,000 migrant workers converge on Altimira in search of work.

But the destruction caused by Karará will be as nothing compared to that caused by Babaquara and the four other dams — Ipixuna, Kokraimoro, and Jarini, all on the Xingu, and Iriri, on the river Iriri — to be built upstream of Altimira. According to the Commissario Pro Indio, Babaquara alone will flood 7,200 km², creating one of the world's largest man made lakes, although CNEC puts the figure at 4,120 km²: all told, the entire Xingu project will cover an area of at least 18,000 km². Over 400,000 hectares of Indian land will be flooded, affecting 12 tribes — the Arrara, the Koatinemo, the Arawete, the Asurini of the Xingu, the Juruna, the Parakana of Bom Jardim, the Pakaçimba, the Apyterewa, the Xikrin of Bacaja, the Curua, and several Kayapo groups, notably the Karará and the Kokraimoro. At least 4,000 Indians will be directly affected, in addition to numerous miners, squatters and small farmers.

Although Eletronorte claims that Babaquara is now being "reconsidered", independent experts, such as Dr. Alan Poole of the Sao Paulo-based Instituto de Eletrotecnica e Energia, are sceptical. Poole points out that without Babaquara, the Karará dam would make little sense, since it is a run-of-the river dam and has little storage capacity of its own. It could not therefore be run at full capacity.

Progress for Whom?

For all the social and ecological devastation that the Altimira dams threaten, the local colonists — particularly the shopkeepers and businessmen — are almost universally in favour of the dam. Despite the counter-slogans daubed on the pro-dam billboards ("Dams are ecological AIDS") ("Dams mean Death"), there is no disguising the mood of the town. The belief that the dams will benefit Altimira is deep-rooted and the faith placed in Eletronorte's technological prowess goes hand-in-glove with the frontier spirit of the local population. "Amazonia is Ours" proclaims a banner stretched across the main street. "Energy is Progress" reads another. T-shirts, handed out free (courtesy of the local Mercedes dealer) by MOPRAK, the Movemiento Pro Karará, sport the same message.

The Monday that the Indians opened their gathering, some 6,000 people turned out for a rally in favour of the dam. The day had been declared a holiday and there was a carnival atmosphere in town. Bands, mounted on floats, rocked to the beat of samba, the demonstrators dancing in their wake. The demonstration snaked its way noisily around the town, the crowd becoming more frenetic as the afternoon wore on, the slogans more raucous, and the carnival atmosphere giving way to sometimes open intolerance. "Kar-ar-ao! Kar-ar-ao! Amazonia e Nostra! Energia e Progresso!" Some are in tears; others punch the air with their fists. "They certainly know how to put on a show", remarked a news reporter. "It's frightening," replied his colleague. Energy may still be "progress" for the townspeople of Altimira, but conditions at other "dam towns" tell a different story. Certainly, local businesses have profited from the influx of migrant workers to the construction sites, but promises that the dams would bring asphalt roads, schools, hospitals, mains drainage and other basic amenities have proved hollow. At Tucurui, the town still lacks even the most rudimentary facilities, and most of its population remains condemned to live in ramshackle, unsanitary and squalid shanty towns.

Nor will the bulk of the energy generated by the Altimira complex be available locally. Only one third of the 18,000 MW generated is earmarked for Amazonia: the rest will be sent south via a long-distance transmission line to Sao Paulo and Rio de Janeiro, and north-east to the Belem area. There the energy will be used to power industries, many of them grossly polluting, manufacturing goods largely for export. It is a story that has been repeated time and again, at dam after dam, in Brazil. Tucurui, for example, powers a giant aluminium smelter, owned by ALUMAR — a consortium made up of ALCOA and Shell-Billiton. The company is provided electricity at almost one third of the price charged to domestic consumers, and at a rate which covers just one per cent of its generating costs. All told, electricity subsidies to the aluminium industry cost the Brazilian Government some $3 billion a year.

Industry is the foremost consumer of electricity in Brazil, and the industries which consume the most electricity are also the most polluting — aluminium plants, chrome and silicon works, and copper, lead and zinc foundries. It is precisely these industries that will receive the electricity from the dams planned under the *2010 Plan*.

Eletrobras, the government state power company, of which Eletronorte is the North-eastern arm, insists that without the new dams, the country will suffer an "energy crisis". Yet studies by the World Bank and others suggest sufficient generating capacity already exists in Brazil to satisfy the expected rise in demand over the medium term, provided that the energy is used more efficiently. According to a 1986 World Bank report, "Installing more efficient end-use equipment in Brazil during the next 15 years in order to reduce electricity demand by 87 Terawatt-hours

The entire Xingu project will cover an area of at least 18,000 km² (7,000 square miles). Over 400,000 hectares of Indian land will be flooded, affecting 12 tribes. (Photo: A. Tarnowski)

in 2000 could eliminate the need to construct 22 Gigawatts (GW) of generating capacity. This is equal to nearly half of the projected new capacity that must be completed by 2000, in addition to capacity now in place or under construction." The report goes on: "Avoiding constructing 22 GW would save utilities from having to invest at least $44 billion (in 1985 dollars) in new power supply facilities. The required investment in greater end-use efficiency, on the other hand, is estimated to be under $10 billion."

Ten billion dollars is the estimated cost of the Altimira dams.

A Record of Broken Promises

Eletronorte acknowledges that considerable ecological and social damage has resulted from the construction of other dams in the Amazon — notably Balbina on the Rio Uatuma (described as "a folly" by the US Director to the World Bank and as a "disaster" by the director of Brazil's own Secretariat for the Environment) and Tucurui — but insists that it has learned from its past "mistakes" and will correct them at Karará and Babaquara. One has to be extremely trusting, however, to take such assurances at their face value — and neither the record of Eletronorte nor that of the Brazilian Government inspires such trust. Indeed, it is a measure of the scant regard shown by the Brazilian authorities towards the environment and tribal rights that the original *2010 Plan* scarcely even discussed the *Plan*'s inevitable social and ecological impact.

The history of Balbina itself provides a suitably cautionary tale. According to the human rights group Survival International, the agencies charged with environmental protection and with overseeing the resettlement of displaced Waimiri-Atroari Indians proved "unable or unwilling to fulfil the commitments they made or indeed their legislative mandates . . . Until at least April 1987, there was no resettlement plan, the legal measures (demarcation) to protect Indian land had not been taken and the groups had no clear idea of the physical consequences of the dam." Indeed, "the demarcation of Indian land was only agreed after the dam *began* to be filled — and it has still to be ratified legally. Perhaps inevitably, the resettlement, hurried and virtually unplanned, has resulted in serious social conflicts among the Indians."

Survival International is damning of the company's overall record: "Planning has been *ad hoc* and ill-considered, and resources and staffing inadequate and poorly trained. Indian land rights have been neglected, and essential health measures inadequately provided, while the basic policy has been one of over-hasty and enforced integration, providing little or no time or opportunity for the Indians to comprehend, let alone control, what was happening to them. The result has been economic impoverishment, social disorientation, cultural demise, disease and death."

Window-dressing and questionable intentions are similarly the hallmark of Eletronorte's "environmental mitigation" measures at Balbina, and elsewhere. An animal rescue operation to save flora and fauna from the floodwaters quickly ran out of money and was described by one biologist as "a facade". Scarcely any of the 2,346 km² of forest in the reservoir area was cleared before flooding — this despite the experience of Tucurui, where the drowning of uncleared forest led to massive eutrophication as the vegetation and trees rotted, resulting in numerous fish kills and the poisoning of water supplies. Although Eletronorte is now conducting studies at Tucurui to assess the impact of the dam on aquatic life (in order to "correct past mistakes"), scientists working on the project describe the programme as a "sham". Little of the money paid to the private company contracted to complete the research has reached the scientists in the field and Eletronorte appears uninterested in the results.

Nor should that come as a surprise. A

report by the Commissario Pro Indio notes: "Eletronorte is required by law to undertake viability studies which evaluate the impact of projects on the environment and the regional population . . . The influence of such evaluations on decisions related to the project is very limited. In the eyes of Eletronorte, such studies are undertaken exclusively for legal reasons and because the World Bank requires them: at the moment of actual decision making, the studies are not really taken into consideration, and the researchers who conduct them are not even present."

Significantly, that view is endorsed by the World Bank, which, in a 1985 staff appraisal report, commented that the Brazilian electricity utilities pay "only rhetorical attention at higher managerial levels to sociological and environmental variables as reflected in some of the projects at present under construction."

But even if the Brazilian authorities were true to their word, and implemented the widest possible steps to "mitigate" the damage that will be caused by the planned dams, it is extremely questionable whether any measures can ever reduce the social and ecological impacts of large dams to an acceptable level, particularly in the tropics. No measures can ever undo the devastating body-blow that the loss of a homeland, a way of life and an identity delivers to a traditional culture. No animal rescue scheme can conceivably "mitigate" for the loss of a belt of pristine tropical forest, where a single hectare may contain up to 400 trees, every other one a different species, and thousands of insects — diversity which can never be reconstituted, let alone be fully compensated for, by a reforestation programme. No measures can safeguard against the inevitable invasion of waterborne diseases, such as bilharzia and malaria, which accompany the filling of the reservoir. No measures can forestall the impact of reduced silt loads on aquatic life downstream. No measures can prevent the influx of settlers that follows as the dam's access roads (and its reservoir) open up new areas of forest, nor the deforestation that ensues as the settlers clear land to eke out a living. And no measures can stem the climatic changes that such deforestation causes.

And whilst deforestation proceeds unchecked, so erosion increases and the soils of the watershed are washed into the local rivers, bringing the day when the dam's reservoir simply silts up inexorably closer, eventually rendering the dam inoperable. Already, the debris in Balbina's reservoir regularly clogs the dam's turbines, whilst in China, the Laoying dam suffered such high rates of sedimentation that the dam's reservoir silted up before a single megawatt was produced.

Opening Up Amazonia

Nor will the ecological and social damage caused by the planned dams be limited to the immediate area of the dams themselves. The *2010 Plan* is explicitly intended to *open up* Amazonia to industrial development. Indeed Eletronorte touts Altimira's proximity (at least in Amazonian terms) to sizeable mineral deposits as a major reason for damming the Xingu. According to the company, the Altimira complex will supply "a privileged source of energy . . .for meeting the energy needs which the mineral development of Amazonia, which is only now beginning, will possibly require."

The impact of industrialization is already evident. Brazil currently earns some $9,000 million from mining operations, many of them in Amazonia. Massive reserves of gold, diamonds, uranium, titanium and tin have all been discovered in the forests — and Brazil is determined to exploit them. In the north-east of Amazonia, the Greater Carajas Project is already opening up one sixth of Brazilian Amazonia to industry and industrialized agriculture (*see also The Ecologist* Vol.17, Nos 2/3 and Bruce Rich in this issue). All told the project occupies 900,000 km^2, or an area the size of France and Britain combined. The centre piece of the project is the Serra dos Carajas open-cast iron ore mine. Other projects include a bauxite mine capable of producing 8 million tonnes of bauxite a year, and an aluminium smelter that will produce 800,000 tonnes of aluminium and 20,000 tonnes of aluminium oxide a year for sale to Japan. The project is likely to lead to severe water and air pollution, many companies having been enticed into it through promises of less stringent pollution controls. In addition, some 55,000 km^2 of forest will be cleared to make way for export-oriented plantations and biomass fuel farms. A further 30,000 km^2 will be given over to ranches. The project as a whole will affect the homelands of 23 tribal groups.

The threat to the forests is severe. Approximately half of the Grande Carajas region (some 450,000 km^2) is forest, ranging from true forest to seasonal evergreen forest and open savannah. The immediate threat is from the iron-smelters and charcoal plants being set up along the railway corridor to the sea, and from mining operations in and around the main mineral reserves. One and half million hectares of forest have already been hewn down and burnt to provide charcoal for the project's pig iron furnaces, the annual production of 2.5 million tonnes of pig iron causing the loss of 610,000 hectares of forest a year. Thirteen thousand Indians have been deprived of their land, and the area has now been invaded by a flood of settlers, causing still more devastation. The programme is an ecological and social disaster on a grand scale: any further industrial development in Amazonia would bring nothing less than catastrophe.

Mining is causing severe social and ecological problems. Clashes with Indians are frequent and mercury pollution widespread. In Rondonia alone gold production increased from 4 kilograms a year in 1974 to 3,600 kg/year in 1984. (Photo: N. Hildyard)

"In the eyes of Eletronorte, environmental and social impact studies are undertaken exclusively for legal reasons and because the World Bank requires them: at the moment of actual decision making, the studies are not really taken into consideration, and the researchers who conduct them are not even present."

The Power Sector Loan

The Brazilian Government had hoped to finance the Altimira dams from a $1.1 billion loan to Eletrobras, $500 million of the loan coming from the World Bank and the rest from a consortium of banks (including Citibank, Midlands and Lloyds) under a larger debt rescheduling deal worth $5.2 billion. The Bank, under pressure from environmental and human rights groups, has now announced that it will not go ahead with the loan and the commercial banks have withdrawn their support.It is a major victory for the NGOs and, hopefully, signals a *real* change in Bank policy. For the Bank's handling of the first power sector loan cast grave doubts on its commitment to "greening" its development aid (*see also* Bruce Rich in this issue). As planned, the loan would have formed the second half of a billion dollar package to the Brazilian power sector, the first power sector loan (also valued at $500 million) having been dispersed in 1986. The first loan was only approved after considerable internal opposition: indeed, two executive directors, including the US executive director, voted against the loan specifically on environmental grounds, the first time in the history of the Bank that such action had been taken. Britain's executive director raised several objections to the loan, but nonetheless went ahead and voted for it.

Because the funding was in the form of a lump sum to the power sector, rather loans to named projects, the World Bank has tried to maintain the fiction that its power sector loans have played no part in funding Amazonian dams. Indeed, in 1988, a senior Bank official told its annual meeting in Berlin that the World Bank "has not financed and does not intend to finance hydro-power projects in the Amazon."

Leaked minutes of a meeting of the Bank's Executive Directors, held in July 1986 to discuss disbursement of the first power sector loan to Brazil, give the lie to such protestations of innocence. During the discussions, several dam projects (all to be funded with the money from the loan) were discussed by name; they included the Itaparica sub-project, the Jiparana dam in Rondonia (which would flood a proportion of an Indian reservation which the Bank had previously helped establish), the Balbina dam and the Tucurui dam. The US Executive Director argued forcefully that authorization of the loan was "entirely premature", and that "major environmental questions, to all appearances, were being swept under the rug". The British representative also spoke out against the loan, stressing that "environmental protection components of the project were much too weak and consisted mainly of promises to be fulfilled in the future with very few concrete measures supported by substantive analysis." Nonetheless, the loan went ahead, bailing out several notorious dam projects which the Bank had previously refused to fund, including Tucurui and Balbina.

By opting to finance amorphous sector loans, the Bank undoubtedly wished to side-step opposition from environmental groups, which had previously been able to oppose funding for dams on a project-by-project basis. It is a strategy that has failed.

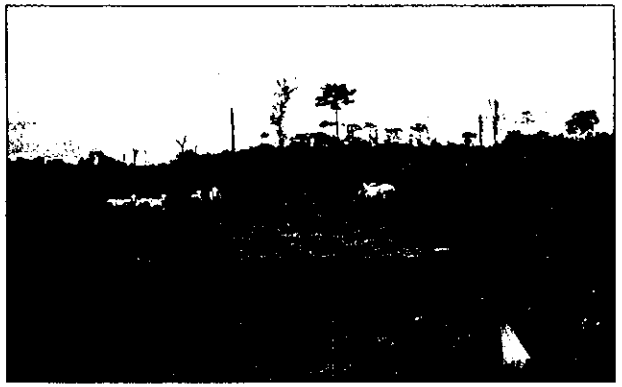
In place of the second power sector loan, the Bankhas now declared that it is to give an initial loan of about $400 million to be used strictly for environmental purposes, including funding for a new environmental protection ministry and new procedures for environmental impact assessments. Approximately one quarter of this initial loan is for investments in energy efficiency and conservation. Later this year, two additional loans of about $300 million each will be made to the power sector for distribution and transmission, and each will include about $100 million for further investments in efficiency and conservation.

But even the victory over the power sector loan does not mean that the battle is over — and it will never be until the Brazilian Government announces that it is abandoning its plans to open-up Amazonia. Not only does Brazil have an appalling record of implementing environmental protection measures of the sort now being demanded by the Bank, but other loans are in the offing, and the on-off history of funding for other Bank projects around the world, notably the Narmada scheme in India and Indonesia's Transmigration scheme, illustrate how easily a decision made today can be overturned tomorrow. Moreover, in the wings lie the Japanese, keen to invest in Brazil and notoriously indifferent to the environmental consequences of their investments. Recently President Sarney of Brazil requested $10 billion in "development" loans from Japan: if that money comes through, implementation of the Xingu phase of the *2010 Plan* might seem almost inevitable, with or without the World Bank loan. In that event, the prospects for Amazonia and its people would be grim indeed.

The Shape of Things to Come

One need look no further than Altimira and its immediate surroundings to see what the future holds. Proud of its reputation as "Capital of Amazonia", the town makes its living from ranching and gold. It is a bastion of the conservative ranchers' union, the UDR, two of whose members have now been arraigned for the murder of Chico Mendes, the rubber tappers' leader whose fight to save Amazonia had made bitter enemies within the ranching fraternity (*see* The Ecologist, Vol. 18, No 6). Down by the harbour, the city council has built an elaborate promenade, complete with bandstand and fountains. The bandstand is crumbling, the fountains do not work, and the paving stones are a network of pot-holes. There is not a single main drain in the town.

Over 60,000 settlers have now made Altimira their home, the vast majority of them living a desperate existence in the shanty towns on the banks of the Xingu. The conditions in which these unfortunates live are beyond description. A local Catholic priest recalls how a man called to



The forests in Brazil are being lost at four times the rate previously estimated — some 200,000 km² disappearing in smoke during the 1987 burning season alone, a figure equivalent to the United Nations Food and Agriculture Organization's previous estimate for the entire annual loss of forest worldwide. (Photo: N.Hildyard)

ask him to baptize his daughter who was dying: "The man and his family, five of them altogether, were in one room, no more than eight foot square. They had to sleep there, cook there, wash there, 'live' there, if that is the right word. Every other room in the shack had another family in it. The walls were made out of wooden slats, many of which were rotten or needed replacing, so there was little shelter from the wind or the rain. The man told me that the house belonged to the owner of the local brickworks where he worked. He was paid 14 cruzados (less than $10) for a 60 hour week and paid 8 cruzados a month in rent. Almost all the money he had left went to buy medicines for his child. There was never enough money for a decent meal, and the children were clearly suffering from severe malnutrition. I baptized the child. She died later."

Down on the waterfront, an Indian woman rants against the planned dams. A small crowd of ranchers and boatmen surround her, laughing and goading her on in her drunkenness. Her eyes are full of anguish, her face tormented, but there is no sympathy from the crowd, only amusement. In a quick movement, surprising for one so drunk, she snatches a whip from one of the ranchers. For a moment she looks menacing, but her fumbled attempts to crack the whip only raises more laughter. A rancher removes the whip and the crowd disperses. She is left alone, just another "civilized" Indian.

Two hours upstream from Altimira lie the Ilas das Fazendas, now transformed into a warren of goldmines since gold was first discovered some 40 years ago. Gaping holes — spanning a hundred metres or more — have been carved out of the hills, an army of *garimperos* (miners) hacking and digging away the earth and rock by hand. The pits, a sea of red mud, stand out like sores against what remains of the forest. Hundreds work here, pumping water from the river, hosing down the open face of the mine to wash down the earth, crushing the rock, washing the debris, and finally panning the muddy waters in an ever hopeful search for gold.

The gold fetches $10 a gram, the mine's owner receiving 55 per cent of the sale and the *garimperos* getting the rest. But the 45 per cent that remains after the owner has taken his share must be divided up amongst the whole workforce: the panners get their percentage, the diggers theirs, the hosers theirs, and the ubiquitous guards theirs, leaving most *garimperos* no more than just 2 per cent to live on. Few ever make it rich and most are in continual debt. They must rent their hovels of houses from the mine owners, who also control the shops where they buy their food, often at grossly inflated prices. VD is rife, as is malaria. Meanwhile, in Altimira and other mining towns, families await the return of husbands and fathers who have gone off in search of gold. Many never come back, too ashamed to return poorer than they left, leaving their "gold widows" to cope on their own. It is a world of broken marriages, disease and squalor. "And all this", my travelling companion John Papworth remarked, "after 40 years of mining one of the world's most precious commodities."

At the Ilas das Fazendas, mercury is still used to separate the gold from the ore, despite a government ban on its use following a public outcry over mercury pollution in gold-mining areas. In Rondonia, where gold production increased from 4 kilograms a year in 1974 to 3,600 kg/year in 1984, fish have been found with mercury levels 4 times in excess of the World Health Organization's safety limit. Mercury levels in the eggs of one species, the acari-bodo, were nearly 8 times higher than the WHO limit. Although they recognize the ecological threat mercury poses, the miners at the Ilas das Fazendas argue that they have no choice but to continue using it, since the ore is too fine for mechanical separation. Moreover, they distrust the Government's motives for the ban, insisting that its real purpose is not to protect the environment but to favour the larger companies which have the machinery to mine without mercury. Whatever the truth of that, there is little prospect that illegal mercury use will be halted. Like so much government legislation, the ban is unenforced — and, so long as gold-mining is permitted, probably unenforceable. Meanwhile, the pollution of the Xingu and other rivers continues, bringing yet another ecological catastrophe ever closer.

Forest Destruction

And then there is the inevitable deforestation. Flying over Amazonia, it seems almost inconceivable that the forests stretching for mile upon mile below, over an area almost the size of Australia, could be in jeopardy. But one has only to travel up the TransAmazonia Highway in either direction out of Altimira and the threat is all too clear. On both sides of the road, the forest has been cleared as far as the eye can see. For the most part, it has been cleared for cattle ranching. Today, there are over 8 million cattle in Brazilian Amazonia. Meat production is extremely inefficient (50kg/hectare/year), making ranching an activity which is so wholly uneconomic that it would probably never have been undertaken on the present scale if the Brazilian Government, with aid from the World Bank and other multilateral development banks, had not poured $2 billion into subsidizing the cattle industry in Amazonia. Although further subsidies were suspended for a three-month period in December 1988, a suspension which has now been extended "indefinitely", many believe that they will be reinstated once Brazil has secured the international financing it is now seeking for further "development" projects in Amazonia.

Although some of the land which has been cleared is now covered with secondary growth, its dense foliage is deceptive. Not only does secondary growth lack the biological diversity and soil and water retaining capacity of the original primary forest, but, unless left untouched for considerable periods (40 years or more) it will never regain anything approaching its former glory. Farming in the forest is thus only sustainable in the long-term if it is extensive, with the land being abandoned after periods of no more than three years and then left fallow for periods of 15-30 years to allow the land to recover. The colonists who have moved into Amazonia do not respect such long fallow periods, the fallow cycle being cut to between 3-5 years. The result is that the forest never has a chance to recover and is quickly reduced to scrub. Where the land is cleared for ranching, the process goes a step further: annual burning of the land to encourage grass growth kills the seedlings that would permit regrowth. The land is thus transformed into savannah, where little survives except fire-resistant (and often toxic) weeds; it is useless for agriculture and, after a time, useless even for cattle. Indeed, virtually all of the ranches set up in Amazonia prior to 1978 have now been abandoned.

Satellite photographs reveal that the forest in Brazil is being lost at four times the rate previously estimated — some 200,000 km² disappearing in smoke during the 1987 burning season alone, a figure equivalent to the United Nations Food and Agriculture Organization's previous estimate for the entire annual loss of forest worldwide. The figures for 1988 are expected to be even worse. The smoke over Amazonia was so dense that La Paz airport in Bolivia had to be closed on several occasions: many fear that over 400,000 km² could have been destroyed, leading the World Bank to issue a statement at its Berlin meeting describing the annual loss of forest as having reached a "critical level". Official figures put the area already lost at 4 per cent of the total forest domain: independent experts, however, say the real figure is closer to 15-20 per cent. If the destruction continues increasing at its current exponential rate, then, predicts Jose Lutzenberger, one of Brazil's leading ecologists, "by the year 2000 everything will be gone". And the year 2000 is little more than ten years away.

Already local people complain of changes in the weather — the rains coming less frequently and more unpredictably. Indeed, scientists warn that deforestation is so disrupting the hydrological cycles which ensure the recycling of rainfall throughout Amazonia, that areas of unaffected forest downwind of deforested areas could be lost to desiccation rather than outright burning. The danger is particularly severe because most of the destruction is taking place in eastern Amazonia, the very area that supplies rainwater, through evapotranspiration, to the forests further west.

A Climatic Flip?

Equally worrying is the possibility — far too long dismissed as remote — that further deforestation could trigger a major climatic flip. Cutting and burning the forests not only adds appreciable quantities of CO_2 to the atmosphere, but — and this is a critical factor — it also deprives the earth of one of its major mechanisms for absorbing CO_2 — the trees themselves. The attack on the chemical equilibrium of the earth's atmosphere is thus twofold.

The fear is that the process could go beyond the greenhouse effect (which many scientists now accept is already under way) and actually change the chemistry of the atmosphere to such an extent that the higher mammals might not be able to survive. As James Lovelock, the originator of the Gaia Hypothesis, points out, "Earth is a responsive living organism that will at first tend to resist adverse environmental change and maintain homeostasis. But if stressed beyond the limits of whatever happens to be the current regulatory apparatus, it will jump to a new stable environment where many of the current range of species will be eliminated." Significantly, Lovelock sees tropical forests as one of the most important of Gaia's regulatory mechanisms. Fanciful as the idea of a climatic flip might seem, it is well to remember that for the greater part of the history of the planet, the atmosphere of earth was such that it could only maintain bacterial forms of life.

At the very least, the greenhouse effect can only be exacerbated by continuing deforestation. Indeed, the likely consequences of global warming are themselves sufficiently alarming to make steps to combat deforestation an international priority. Rising sea levels alone could lead, either directly or indirectly, to the loss of one-third of the world's croplands (*see The Ecologist*, Vol.19, No.1) and the flooding of several major cities over the next century.

Paranoid Xenophobia

Sensible discussion of the fate of Amazonia is forever dogged by a xenophobia that at times verges on the paranoid. Calls for a moratorium on the further development of Amazonia both by Brazilian groups (such as the *Save the Amazon* campaign) and international environmentalists have met with indignation. Typical of the response is that of one Brazilian who told me: "We won't tolerate the international community telling us what to do with Amazonia. If you cut off funding for further development and try to impose a moratorium, we would simply go it alone. I would rather that Amazonia was a desert so long as it was a Brazilian desert." Even amongst well-informed conservationists, there are those who see international concern over the future of the forests as a plot to undermine national sovereignty and keep Brazil poor. At one meeting, I was even assured that the majority of American missionaries in Amazonia were working undercover for US mining interests: why else had they been seen with geiger-counters? And who else would pay for their airstrips and private airplanes?.

Such claims may seem laughable, but the obsession with national sovereignty that underlies them is not to be dismissed lightly. Brazilians — and in particular the military — see an unoccupied Amazonia not as an ecological blessing but as a political threat: without settlers to establish Brazil's rights to the land, the argument goes, Peruvians, Venezuelans, and others will simply invade and take what is rightfully Brazilian territory. Such thinking underlies the so-called "Calhe Norte" programme in the north of Amazonia, where the Brazilian army has set out to "secure" the 4 000-kilometre border with Peru, Colombia, Venezuela, Guyana, Suriname and French Guyana. Some 50,000 Indians, notably the Yanomami, are affected by the project.

Plans to develop Brazil's northern frontier were first mooted in the early 1960s, and led to the construction of several major roads in the area. The project came to little, however, partly because the lack of supply towns in the region acted as a disincentive to would-be settlers, and partly because there were insufficient funds to complete the planned Northern Perimeter Highway (NPH), which was eventually abandoned to the jungle. In 1985, the project was resurrected with a vengeance. For its part, the military announced it would set up outposts throughout the region, whilst the

civilian Superintendency for the Development of the Amazon detailed plans to complete sections of the old NPH project in order to exploit the area's massive mineral reserves, including the world's fourth largest reserve of bauxite. Deposits of calcium, potassium, phosphates, and cassiterite have also been earmarked for mining. To implement the project, it is intended to concentrate the local Indian groups, whose land it is, into "small population nuclei" and thus to release their land for industrial and agricultural projects. As such, the programme — quite apart from being ruinous to the environment — is in direct contravention of the new Civilian Constitution, which gives Indians the exclusive ownership of the land they occupy and the exclusive rights to the resources therein.

Debt Swaps

Nonetheless, there are some hopeful signs of change. International concern over the threat of climate change in particular has provoked a series of proposals to bring an end to deforestation in Amazonia, and has generated an increasingly polarized debate within Brazil itself. One issue on which there is some degree of concensus amongst those concerned with deforestation is the need for land reform. Few informed Brazilians dispute that there is more than enough good agricultural land within the south and centre of Brazil to feed the country, without a single hectare of Amazonia ever needing to be cultivated. The problem is that Brazil's most fertile agricultural land is now largely taken over by plantations producing crops, such as soya beans, for export. Eighty-one per cent of Brazil's farmland is now held by just 4.5 per cent of the population, and 70 per cent of the country's farmers are landless, having either been bought out by the larger estates, or simply driven off the land. Rather than take the politically explosive step of dividing up the large estates, however, the Brazilian Government has traditionally promoted the colonization of Amazonia as the solution to landlessness. Indeed, the now notorious Polonoroeste Programme (*see The Ecologist*, Vol. 15, Nos 1/2 and Bruce Rich in this issue) was officially promoted as "the largest agrarian reform programme in the world".

Agreement on the need for land reform is one thing: implementing it is another. The vested interests opposing the redistribution of land are powerful and intransigent: they include not only private landowners, but the Catholic church and major multinational companies, such as Olivetti, Volkswagen, Pirelli, BASF, Philips, Siemens and Hoechst.

Moreover, land reform without major accompanying changes in social and economic policies would amount to little in the long-term. So long as Brazil is committed to export-led economic growth, both to fund its crippling debt repayments and to finance further development schemes, plantation agriculture is inevitable, and with it a system of production that is inconducive to small-holders. However radical the land reforms, the concentration of holdings in the hands of more successful farmers would sooner or later re-emerge as a problem.

The need to service its debts has become one of the Brazilian Government's principle rationales for justifying its plans to develop Amazonia. To ease the debt burden, now standing at $100 billion, many are now looking to "debt-for-nature" deals as a solution which would be beneficial to both parties, parcels of debt being effectively written off in exchange for agreements to preserve tracts of rainforest. Several such deals have been carried out by conservation groups, notably in Bolivia and Costa Rica, but the deals have involved small amounts of debt and small areas of forest. An initiative for a wider debt swap programme, however, has been proposed by Prime Minister Michel Rocard of France, who met with President Sarney of Brazil in February 1989. Publicly, Sarney rejected the overture outright, telling a press conference that "Not one inch of Brazilian soil will be sold to foreigners" — a slogan that not only ignores the sizeable areas of Amazonia already effectively controlled by multinational interests but which also distorts the intention of the proposed "debt-for-nature" deals, which, unlike conventional "debt-for-equity" agreements, are not intended to secure outright ownership of the land in question. Indeed, in what is the most far-reaching of the debt swap proposals to date, the financier Sir James Goldsmith has suggested that, far from having to cede their land as a *quid pro quo* for debt relief, tropical countries should in fact be *paid* a sizeable annual rent by the industrialized world in return for forests which are set aside and protected. Goldsmith would like to secure an *international* agreement on the Third World debt as a whole, in order to save not only Amazonia but rainforests throughout the world. But, as with land reform, debt-for-nature deals will achieve little without major policy changes. At best, the authorities see such deals as part of a strategy which would effectively section off parts of Amazonia as national parks for "preservation", leaving the majority of the forests open for exploitation. It is a problem that has beset national parks throughout the world: once established, the parks provide governments with visible symbols of "environmental awareness" that are then used to deflect criticism from the destruction taking place around them. Moreover, unless the social and economic causes of deforestation are tackled at root, the assault on the forests will continue, slowed down maybe, but just as disastrous in the long-term.

A Change of Heart?

It is a fatal flaw that lies at the heart of all the "official" solutions to deforestation that have been proposed so far. This month, for example, the World Bank issued an unusually severe criticism of past Brazilian development policies (and the Bank's part in financing them) written by Dennis J. Mahar, an advisor to the Bank's own Economic Advisory Staff. The document, *Government Policies and Deforestation in Brazil's Amazon Region*, argues that blaming peasant colonists for deforestation (currently still the stock response of the multilateral development banks) is "tantamount to blaming the victim". It would be more accurate, says Mahar, to blame "misguided public policies which purposely or inadvertently encourage rapid depletion of the forest." Among the policies which Mahar criticizes are those which promote road-building, official colonization of the forest, and extensive livestock development. He concludes: "There is no doubt that rapid deforestation will continue if present policies remain unaltered."

Mahar proposes five immediate policy changes:

- "The elimination of fiscal incentives for livestock projects in Amazonia";
- "A moratorium on disbursements of fiscal incentive funds for any projects in the Greater Carajas area — such as the proposed (*sic*) pig-iron plants — which would use charcoal derived from the rainforest as their principle source of energy";
- The modification of policies which recognise "deforestation as a form of land improvement and, as such, grounds for granting rights of land improvement";
- The abolition of the so-called "50 per cent rule", whereby farmers have to show that 50 per cent of their land is under cultivation in order to receive tax benefits and its replacement "by legislation which expressly permits the formation of contiguous 'block' reserves equal to 50 per cent of the total area under agriculture in a given region rather than 50 per cent of each farmer's lot."
- And, greater effort to improve the collection of taxes, such as the current 25 per cent capital gains tax on land appreciation, which "could help to dampen speculative pressures."

Mahar argues that an "alternative development model" should be introduced "that emphasizes the region's comparative advantage in forest-based economic activities. Under this approach, the Government would not construct any new roads or provide infrastructure or services (particularly land titles) until detailed land-use surveys were carried out. Once the appropriate surveys were completed and the productive potential of the land known, physical access would be permitted only under special circumstances. . . Lands found to have limited agricultural potential — virtually all of the *terra firme* of Amazonia — would be held in perpetuity as forest reserves closed to all development or as sites for environmentally benign activities such as rubber tapping and Brazil nut gathering, tourism, or sustained-yield logging."

Sustainable Development?

By World Bank standards, it is a radical proposal, although it should be noted that Maher's book carries a disclaimer that its views are the author's own and "do not necessarily represent the views and policies" of the Bank itself (indeed, they do not!). But even supposing that the rhetoric was translated into reality, would the zoning of Amazonia as suggested effectively halt the rush to destruction? Even assuming that the *terra firme* of Brazilian Amazonia (a large proportion of the total area) was set aside as extractive reserves or for forest-based industries?

All the schemes proposed to date for the "sustainable development" of Amazonia are intended to enable forest peoples to participate fully in the market-place, enjoying the consumer goods they now demand, but without destroying the environment. Most involve marketing forest products, using traditional methods of production. Indeed, many schemes explicitly exclude the marketing of products which would lend themselves to plantation agriculture because of the deleterious environmental impact that this would cause.

Logging apart, there is little question that the forests of the *terra firme* are quite capable of providing a sustainable livelihood if ecological limits are observed: indeed, they have done so for generations of both Indians and rubber tappers. But that sustainability of production rests critically on two factors: first, a low level of material demand; and, second, a culture and a social organisation that not only *recognizes* ecological limits but which also *respects* those limits. The vital questions now facing environmental and indigenous groups alike is: Can those conditions be maintained once production is geared to satisfying national, let alone international, markets? And can sustainability be ensured whilst the "outside" world remains committed to export-led development programmes, even allowing for strict zoning?

If the forests of Amazonia have remained intact for as long as they have, it is largely because populations have been kept low and minimal demand has been placed on the forest's resources. The forests have indeed been able to supply a sufficient surplus to ensure a bountiful life for small groups and protect them against lean times, but it is another matter entirely to expect them to supply a surplus sufficient to satisfy the demands of the same small groups once they have embraced the sort of consumerism that advertising and the market now foster. To pay for a modern consumer life-style, it would not be enough to market the odd Brazil nut: on the contrary, the marketable surplus required would be way in excess of anything achieved historically. The overall effect on the forests of achieving that surplus would the same as a sudden rise in local population levels: and the greater the surplus demanded, the closer the forest's carrying capacity would come to being exceeded. This is as inevitable as night following day: indeed, unless specific limits are placed on the volume of production and consumption, no form of sustainable forest management, traditional or otherwise, is likely to remain sustainable for long.

Such limits, however, depend vitally on the maintenance of traditional cultural values. Yet, so long as the wider national and international community remains committed to growth-oriented values (which is what a policy of zoning and the continuing presence of a consumer society implies), it is highly questionable that such values can survive. Historically, the greatest threat to indigenous culture, apart from disease, has been the gradual encroachment of what is broadly termed the "consumer society". Once fully enmeshed in the market economy (and there is scarcely an Indian group within Brazil that is not caught up in the market to a greater or lesser degree) it is all but inevitable that the very traditional social controls which enabled the Indians to live in harmony with their environment simply begin to break down. Already many groups have espoused a pattern of consumption that Linda Greenbaum, writing in *Cultural Survival Quarterly*, has likened to the "cargo cults" of Oceania. "Tribal members, by adopting certain symbols of Western technology (such as mock radios or airstrips) believe that they are becoming the dominant power instead of the white people." Several groups, encouraged by FUNAI (the Brazilian Indian Agency; *see* Bruce Rich this issue for further details), have signed lumber contracts — often for pitifully low prices — with logging firms. "The money they receive", notes Greenbaum, "is not being invested for the future, but is spent instead on consumer items, especially those of prestige value, and on 'improvements' in Indian reservations that are of no real benefit to the Indians."

Even the Kayapo, whose culture is still strong, are not immune. In 1984, they sold 10,000 mahogany trees in exchange for the building of a 70 kilometre road, and again in 1987, 5000 cubic metres of mahogany in return for a 15 kilometre road, a Toyota, various consumer goods, a pharmacy, medical supplies and some livestock. Amongst the Surui of Rondonia, logging is so extensive that, if it were to continue, then, one logger estimates, all the extractable timber on the reservation would be exhausted in five to six years. Other groups practising lumbering include the Gavaio, the Arrara and the Zoro.

According to Greenbaum, "Most of the Surui men who had lumber contracts in 1987 were living in hotels in the nearby city. Those who were more prosperous had cars with chauffeurs and maintained steady relationships with white prostitutes. Exactly the same occurs with the Kayapo chief, Pombo, and some of his sons: alcohol, white women, hotels and automobiles for the elite prevail."

The Indians themselves are acutely aware of the damage done, both to the en-

vironment and their society, by logging and the sudden influx of money. Indeed, the Suruí have now expelled lumbermen from their reserve, deciding that logging was not in their interests. Similarly, one Kayapo group is reported to have "banned" cars after a child was severely injured by a jeep bought with lumber money. But encouraging as that might be, the dilemma is still there: the desire for consumer goods may not be to the liking of ecologists, and it is certainly inimicable to the long-term health of the forests, but it is a reality, and so long as it remains so, the Indians will attempt to earn money in whatever way they can. Nor is money required just for consumer goods: to establish land-rights the Indians need lawyers, who do not come cheaply, and to win some degree of economic independence from FUNAI, whose integrationist policies have proved disastrous, the Indians need a source of income that they can control.

In that context, marketing forest products, using traditional techniques, is a preferable route to earning money via lumbering or, worse still, working in the city. Indeed, many anthropologists see such marketing schemes as the only hope of preserving Indian culture. But I have my doubts.The truth is that sustainable production and consumerism are incompatible goals. The one relies on limiting demand, the other on increasing it. Indeed, so long as economic growth (and calling it "sustainable growth" does nothing to change its fundamental character) remains the object of our economic activities, Amazonia will always be under the axe. Consumer goods do not appear by magic. Their production depends on recovering the very mineral resources that lie beneath Amazonia and whose exploitation inevitably involves the further opening up of the forests — with all the destruction that this entails. "Zoning" the forest may limit the destruction in a small way but it will not prevent it, for it is a policy that is still geared to the growth-oriented development programmes that are at the root of deforestation and, indeed, the poverty that feeds upon it.

Setting aside Amazonia for extractive reserves is a step in the right direction, but it will only postpone the inevitable if the "outside" world continues to pursue the devastating goal of further growth. The solution must surely lie not in surrendering further to the lure of the market, but in systematically disentangling ourselves from its clutches. In that respect, the saving of Amazonia relies as much on the international community turning its back on growth, reducing the consumption of consumer goods, and adopting policies that reverse current economic trends as on any measures that can be taken within Brazil itself. For it is not just Brasilia and the Brazilians who will have to change, but Washington, London and consumers throughout the industrialized world.

Adios Amazonia?

But such thinking has yet to enter the political agenda in the industrialized countries, outside of the fledgling Green parties, let alone in Brazil. There, the destruction of Amazonia is still seen by the authorities as resulting from "poor planning" rather than the policies that underlie that planning: and the further development of Amazonia is still an Act of Faith for the majority of the population. Indeed, so far as the Government is concerned, the Indians are little more than a nuisance, not least because of the international publicity which their cause attracts. Integration is still the order of the day: as Fernando Mesquita, the Government spokesman on the environment, told the *Financial Times*' reporter at Altimira, "The environment is not an isolated problem. There are 220,000 Indians in Brazil, but in the largest *favella* in Rio de Janeiro alone, we have 300,000 extremely poor people and 10 per cent of them are armed."

Such thinking will not change overnight, but it received a direct (and public) challenge at Altimira. Indeed, in that respect, it is no exaggeration to call the Indians' gathering "historic". Not only did it cement a powerful alliance between indigenous rights groups, environmentalists and the Indians themselves — an alliance that looks set to continue, with further gatherings planned throughout the year in the run-up to Brazil's elections — but it gave voice to a vision of the future, based on traditional ways, that does not accept the need for industrialization as its starting point. As Paiakan put it: "You ask me how we will produce electricity without the Altimira dams. You should be asking me whether we even need electricity." If such ideas are able to fill the ideological vacuum that now exists in Brazil — a country as bankrupt of ideas as it is of money — then there is indeed hope for the future.

But time hangs like a sword of Damocles over Amazonia and its people. For time is one thing that neither the Indians nor the forests have to spare.

The Altimira gathering is over and I am sitting on the verandah of the local Catholic mission, overlooking the Xingu. "A country is only civilized if it has tea at 4 o'clock", remarks John Papworth self-mockingly, putting down a pot of Earl Grey tea, brought all the way from England. He pours the cup and welcomes Maria Aparecida from CIMI, an indigenous rights group, to the table. "I have some terrible news," she says, "I have just heard that 100 Yanomami have been killed by *garimperos*. They burnt the village and forced all the women and children to leave." Her voice is shaking and there are tears in her eyes.

The sun goes down, bringing this year's burning season a day closer, and with perhaps 800,000 square kilometres set to be destroyed. The day of reckoning — perhaps as little as ten years away — edges closer by the minute.

Adios Amazonia. Adios. Unless all of us take action now. And there is no better place to start than right here at home.

• **How you can help.** *Support The Ecologist's million signature campaign calling for an Emergency Assembly of the United Nations to address the problem of deforestation by implementing a radical strategy as outlined in The Ecologist's, A Plan to Save the Forest (Vol. 17, Nos 4/5). For further details and petition forms, write to: ECOROPA, Henhant, Crickhowell, Powys, Wales, UK.*

• **Support the Indians.** *The Ecologist, through The Ecological Foundation, has sent £3000 to the Union of Indian Nations in Brazil to help the Indians organize further gatherings and ensure that the process started at Altimira continues. If you wish to contribute, please send your cheque to The Ecologist, Station Road, Sturminster Newton, Dorset.*