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The priesthood of industrial society

According to the early Christian worldview, this life is but a preparation for the next. If people fulfil their duties towards God in the manner laid down by the Church, then they will be rewarded with a blissful non-material existence in the next world. The duties were of a mainly ritualistic nature, so much so that the Christians were accused of substituting duties towards God for duties towards their fellow men. This "otherworldliness", it was argued, could only lead to the disintegration of society.

Otherworldliness became even more pronounced in the religio-culture of some of the mediaeval heresies who tended to regard the world as so evil that it could only have been created by the devil. All worldly activities, including, in some cases, reproducing oneself, could only help the devil in his evil designs. In such conditions, the only behaviour that could conceivably meet with God's approval was to divorce oneself entirely from the concerns of this world and preoccupy oneself exclusively with those of the next.

Clearly, no psychological terrain could be less propitious for the emergence of a technological society. Not so, however, that furnished by later nonconformist heresies. The Puritans reacted against otherworldliness. They sought to reintroduce duties towards men, not as a substitute for duties towards God but rather as the only true means of serving him.

To achieve the Christian Paradise, they assumed, it was necessary to submit to a rigid set of behavioural constraints which banished frivolities and put a premium on hard work. Work was thereby equated with virtue and the materially successful with the righteous.

It is the well-known thesis of Weber that it was only among men who had developed so singular a world-view. that the industrial revolution could have occurred and that technology could have been sanctified as a tool for achieving one's peace with God.

As industrial activities began to spread so did the ethic underlying and justifying them itself undergo change. Preoccupation with the material products of industry began to obscure their ethical justification, and the materialist paradise that science, technology and industry appeared to be creating came to replace its conventional Christian equivalent, which, to practical men, appeared ever more remote and speculative.

In this way, perhaps, can be traced the genesis of the goal-structure of technological man: the achievement of a materialist paradise in which drudgery, poverty, social inequality, ignorance, unemployment, famine, disease, and even death will have been eliminated once and for all.

It is fashionable to pour scorn on the conventional notions of paradise proposed by the principal religions of today. None, however, is as naïve as this one. Its achievements would violate not only the fundamental laws of thermodynamics, but also practically all the basic principles of biological, ecological and social organization.

One might well ask why are we behaving in so misguided a manner at a time when knowledge has never accumulated faster and when, as we are told, 90 per cent of the scientists who have ever lived are at present operating. Is not the object of knowledge, and in particular "scientific" knowledge, to guide public policy so as to best serve man's interests? How can one explain this apparent paradox? The answer is that modern science is not as objective as it is made out to be. If one examines the world-view that gives rise to the technological goal structure and corresponding social behaviour pattern, one finds that it is taken as given, one might even say, as gospel by the main body of today's scientists. To criticize its basic tenets is to draw upon oneself the wrath, even the sanctions that heretics have often met with from the established church.

Indeed, rather than serve as the critics of our technological society and offer us some protection against its worst abuses, they have been as involved in it, as instrumental to it, as the technologists and industrialists who have exploited their "discoveries". Functionally speaking, they are its priests. It is they who have formulated the world-view that provides its rationale, and they have couched it in the most up-to-date "scientific" terminology, and supported it with a wealth of data, which confer on its principal tenets a degree of indubitability seldom enjoyed by religious dogmas.

What is more this priesthood is backed by massive government subsidies and its prestige and influence are as great as that of the most established of conventional religions. Like other priesthoods, it has reserved for itself the sole right to dispense the "*mana*" or vital force whose accumulation is regarded as a measure of one's power over nature.

In our society this "power" is called "scientific knowledge". This is defined in a very subtle way. It only refers to data accumulated as a result of experimentation. Information deduced from basic principles does not qualify unless it can be "tested" empirically in artificial laboratory conditions.

When unexpected consequences appear in the field, there is an irresistible temptation, on the part of those brought up on the technological ethic, to attribute them to sheer technicalities. The devices themselves, it is usually held, are beyond reproach. They must have been improperly used, or the conditions were not appropriate, or the requisite welltrained personnel was not available, etc.

"Scientific method" does not provide a sure means of testing such assertions. Observation (and hence experimentation) is not the objective means of acquiring information that it is made out to be by empiricist philosophers. It is the brain, not the eye, that observes. An observation is just a hypothesis formulated in terms of the observer's personal model of his environment.

As Wittreich, Wittkin, Ittleson and Kilpatrick, and many others have demonstrated, one observes what one expects to observe. In other words, if one is firmly convinced of the efficacy of certain technological devices, then one is very unlikely to "observe" their inefficacy. On the other hand, one will almost certainly "observe" technical errors in their exploitation.

Man, in fact, is a rationalizing animal rather than a rational one, and modern "scientific method" does little to combat this human failing.

Can Stockholm survive New York?

by Robert Allen

This month the recommendations of the United Nations Conference on the Human Environment (UNCHE) held at Stockholm will begin their slow progress through the General Assembly at New York. What is at stake? What are the vital recommendations and will they survive one more diplomatic bludgeoning? And where do we go from here?

Stockholm has given New York three things to talk about: the Action Plan, the Environmental Organ, and the Declaration on the Human Environment.

The Action Plan consists of 109 recommendations assembled under three headings: environmental assessment (called Earthwatch to make it sound exciting), environmental management (or action proper), and supporting measures, such as education, training, and public information, organizational arrangements, and financial assistance.

Environmental assessment

The most important recommendations are Rs 2, 12, 25, 55, 59, 60 and 61.

R2 recommends among other things that there be a conference/demonstration on experimental human settlements. This would be an admirable opportunity to develop on a realistic scale experiments in the mixed urbanrural communities advocated by the *Blueprint for Survival*. These communities would use low impact technologies, the development of which would be greatly stimulated by such an exercise. Canada has offered to organize and act as host for the demonstration, and she should be encouraged to go ahead at once.

R12 states that WHO should "provide increased assistance to Governments which so request in the field of family planning without delay" and should "promote and intensify research endeavour in the field of human reproduction, so that the serious consequences of population explosion on human environment can be prevented". Hardly controversial, yet it emerged from Conference with some difficulty. In committee it was passed by 23 votes to 17 with 12 abstentions. In plenary it fared better, passed by 55 votes to 18 with four abstentions, though not without being criticized severely by a number of delegations. The Central African Republic, Argentina, Dahomey, Fcuador, Ethiopia, and the Holy See wanted the recommendation either deleted or so modified as to be of no value. However, this was by no means the position of all non-industrial countries. Pakistan, India, and Nigeria strongly supported the recommendation, and Uganda described it as among the most important of the Conference.

For some reason the UK agreed with the Central African Republic that reference to the environmental consequences of the population explosion should disappear. This was one of a number of instances when industrial countries subordinated good sense to diplomacy, the most obvious one being the exclusion from the entire conference of East Germany. The 1974 World Population Conference will have some difficulty overcoming the division between doctrinaire opponents of population policies (such as Argentina, Dahomey, and Spain) and open-minded pragmatists (such as India, Nigeria, and Norway). Yet it must do to succeed. Woolly-minded wavering from manifestly overpopulated countries like the UK will not help.

R25 recommends a World Forest Appraisal Programme, which would provide basic data on significant changes in forest biomass and on the balance between it and the "prevailing environment" whatever that means. As originally drafted, it was intended to provide "an indication of global environmental stability", but this phrase was struck out at the insistence of Brazil Brazil has a lot of forest and does not want it considered anything more than of national importance. So anxious were the Brazilians to remove the phrase that they did not flinch from making the most unscientific pronouncements: global environmental stability, they said, was "scientifically impossible as a stable system does not consume energy"! Brazil was joined in her opposition by Australia, who declared there was no such thing as global environmental stability anyway.

R55 is action by the back door.



Among other things it asks for a "world registry of clean rivers which would be defined in accordance with internationally agreed quality criteria". This is particularly important since rivers are a far more significant source of marine pollution than is dumping. Part iii of the recommendation is especially useful:

"It would be desirable for nations to declare their intention to have admitted to the world registry of clean rivers those rivers within their jurisdiction that meet the quality criteria as defined and to declare their further intention to ensure that certain other rivers shall meet those quality criteria by some target date."

A soft stick but a stick nonetheless. It has been argued that such international criteria are inappropriate, since local conditions vary so much between different countries. Yet coastal and estuarial pollution, however localized has international if not global effects, so that international standards are the only practical way of ensuring one country does not rid itself of its wastes at the expense of another.

R59 recommends that a comprehensive study be made of "available energy sources, new technology, and consumption trends" by 1975 at the latest, R60 recommends that "systematic audits of natural resource development projects in representative ecosystems of international significance" be undertaken after, "and where feasible before", the implementation of such projects. R61 recommends that "pilot studies be conducted in representative ecosystems of international significance to assess the environmental impact of alternative approaches to the survey, planning and development of resource projects". All three are obviously crucial steps in determining those development strategies which can be pursued safely.

Finally, a number of recommendations deal solely with monitoring, such as the monitoring of potentially mutagenic, teratogenic, and carcinogenic agents, and the establishment of 10 baseline stations to watch for long-term global atmospheric trends. But monitoring isn't everything, and is now probably receiving too much emphasis compared with that on direct action. The danger of monitoring is that it lulls politicians into believing they can take no action and still everything will be under control. Yet many pollutants are likely to have an overshoot effect—by the time we perceive the danger it will be too late, for a series of uncontrollable effects will have been set in motion. Similarly, we cannot tell what is the point of no return in any ecosystem change. The level of a pollutant may increase by small increments with little effect on the environment until a critical point is ultimately reached when the next increment, however small, causes the system to collapse.

In addition, there is a scarcity of good historical data, so it is open to the proponents of inaction to argue that a given change could be part of a set of natural long-term fluctuations. Finally, even in those cases where we do have adequate data, excuses are still being found to delay action. Action then is the true test of UNCHE.

Environmental management

The most important recommendations for action are: Rs 3, 21, 22, 32, 38, 39-45, 48, 51, 63, 70, 71, and 103-109.

R3 requires Governments to consult with neighbouring countries whenever environmental conditions or development plans in their country affect others. This is the first step towards bilateral and regional environmental quality agreements and is also a modest though significant counter to the otherwise general and repeated insistence on the sanctity of national sovereignty. Its survival within the Action Plan is comforting in the light of the fate of R21.

R21 is intended to strengthen international programmes for integrated pest control and to reduce the harmful effects of agrochemicals. Unfortunately, it is largely concerned with research, and the only clause that calls for guidelines and standards was weakened in committee by Brazil. Originally, the clause asked simply for the development of international standards for chlorinated hydrocarbons, pesticides containing heavy metals, and biological controls, without reference to any possible "mitigating circumstances" since it is vital to fix standards by ecological rather than political criteria. Brazil, however, insisted that special reference be made to national and local conditions, an amendment which received only mild opposition, resolved by a UK sub-amendment to delete "local" and insert "ecological". This merely cast an environmental patina on what essentially was a wrecking amendment, and

thus with teeth drawn R21 remains.

Asked why the UK did not oppose the Brazilian amendment but instead offered a cosmetic rewording, one of the UK delegates admitted the amendment would have carried the day anyway, since any realistic alternative would have required the industrial countries to spend money. For example, the Brazilians were able to get away with the claim that DDT standards cannot be made the same for industrial and non-industrial countries, only because the industrial countries refuse to subsidize safer and more effective vector control methods.

Penny-pinching dominates the position of the industrial countries (as is clearly borne out in the discussion of Rs 103-109). Brazil, on the other hand, is impelled by a desire to get rich quick by exploiting today's environment at the expense of that of the next generation. Her obsession with economic growth has alienated many of the more responsible Latin American countries, one of which has accused her of being "hand in glove with the multinational companies". So confident is Brazil that ecological laws do not apply within her borders, that she is now touting for other countries' dirty industries eager to escape from controls at home. Global ecological programmes would impress on ordinary Brazilians the dangers to which they are being exposed-which is no doubt why their government is opposed to them.

R22 recommends the recycling of agricultural wastes and the use of municipal wastes as fertilizers.

R32 asks Governments to attend to the need for conventions and treaties to protect species migrating from one country to another, and R33 is the famous recommendation calling for a



10-year moratorium on commercial whaling, the fate of which is discussed by Graham Searle in the next article.

Genetic diversity

R38 recommends that Governments "take steps to set aside areas representing ecosystems of international significance for protection under international agreement"; and Rs 39-45 are entirely concerned with one of the principal reasons for doing so—the conservation of the world's genetic resources.

The maintenance of genetic diversity is of vital importance to global prosperity-indeed to survival-and these recommendations are one of the great achievements of UNCHE. Future food supplies depend on our continuing ability to breed new varieties. This depends on genetic diversity-on the permanent availability of a very great number of plant species. Primitive and unusual domesticated plants have to be preserved in seed collections since the pressure on them is so severe. Wild plants can and should be conserved in their natural habitat, since to be effective plants must be exposed to new diseases, and this is possible only in a living ecosystem.

Most of the recommendations are concerned with research, storage, information exchange, and monitoring, but R39 and R43 enshrine the crucial requirements. R39 recommends that Governments agree to an international programme to conserve the world's genetic resources, and states that "both static (seed banks, culture collections, etc.) and dynamic (conservation of populations in evolving natural environments) ways are needed". Paragraph (d) states that action is needed in six interrelated areas: (i) survey of genetic resources; (ii) inventory of collections; (iii) exploration and collecting; (iv) documentation; (v) evaluation and utilization; (vi) conservation, "which represents the crucial element to which all other programmes relate".

This last statement is spelled out in R43. This recommends that Governments "recognize that conservation is a most crucial part of any genetic resources programme". It is worth quoting paragraph 3 in full:

In respect of plant germ plasms (agriculture and forestry), maintain gene pools of wild plant species within their natural communities. Therefore:



(a) It is essential that primeval forests, bushlands and grasslands which contain important forest genetic resources be identified by appropriate technical and legal means; systems of reserves exist in most countries, but a strengthening of international understanding on methods of protection and on availability of material may be desired;

(b) Conservation of species of medical, aesthetic or research value should be assured;

(c) the network of biological reserves proposed by UNESCO (Man and the Biosphere Programme) should be designed, where feasible, to protect these natural communities;

(d) Where protection in nature becomes uncertain or impossible, then means such as seed storage or living collections in provenance trials or botanic gardens must be adopted.

It is important to conserve genetic diversity in respect of animals as well as plants and this is also recommended.

R48 recommends that Governments "take steps to ensure international cooperation" in the control and regulation of side effects from a nation's legitimate activities when they are likely to disrupt the coastal or estuarial ecology of another.

R51 is another recommendation concerned with shared ecosystems, this time river basins. Unfortunately, like a number of the more important recommendations. it was gravely weakened in committee, this time by Romania, who proposed three crucial amendments. The draft recommendation asked for the creation of "appropriate multinational institutions in the form of international river-basin commissions". The words multinational and international were considered too dangerous and the entire phrase was deleted and replaced by the creation of "river-basin commissions", any old "or other river-basin commissions, appropriate machinery". Then the phrase "the following principles should be upheld" was diluted to "the following principles should be considered by the States concerned when appropriate"(!) Finally, one of these principles, "nations agree that when water resource activities are contemplated that may have an environmental effect on another country, the other country should be notified well in advance of the activity envisaged", was brought to its knees with a well-aimed "significant" inserted before the word "environmental". Sensible people might think this of no consequence, but diplomats and bureaucrats are not sensible people, and a principle such as this will not be worth the paper it's written on once they start arguing about the "significance" of an environmental effect.

R63 requires international development assistance agencies to "revise and broaden the criteria of development project analysis to incorporate environmental impact considerations".

R70 deals with effects on climate, and asks Governments to "carefully evaluate the likelihood and magnitude of climatic effects and disseminate their findings to the maximum extent feasible before embarking on such activities (that might cause climate change)".

The phrase "to the maximum extent feasible" was not in the draft and is a contribution of the USA. In its turn, R71 recommends that the release to the environment of toxic or dangerous substances be minimized, but it is castrated by that time-honoured British phrase "by the best practicable means".

The ocean dumping convention, which was to have been signed to

appropriate fanfares at the Conference, was postponed. If it is not signed this month, it will go to the 1973 Conference on Marine Pollution, R86 is a bon voyage message, and judging by Stockholm it needs it. It was effectively clobbered by Brazil (again) and Mexico, who led the opposition by refusing to agree to any convention unless everybody else agreed to a limit that makes Iceland's controversial 50 miles chickenfeed-200 miles. The US did not help either: they have insisted that military activities be exempted from the ocean dumping convention and are now seeking exemption from all environmental conventions, confirming suspicions that the Department of Defense was better represented in the US delegation than the State Department.

The shadow of Santiago

Rs 103, 104, 105, 106, 108, and 109 are probably the most important of the Conference, since they deal with the effects of environmental protection measures on trade and the economies of the non-industrial countries. If the world is to achieve social and biological stability, the flow of materials and services between the industrial and nonindustrial countries must change radically. The latter are entitled to an equitable distribution of resources, indeed that is the only way in which modest prosperity for all nations can be assured. They should receive prices for their raw materials that reflect their long-term availability and, in the case of plant products, their possibly lower impact on the environment. They should be offered the sort of aid that will enable them to develop within a traditional framework and not as prisoners of industrial economics. They are entitled not to the burden of Western agricultural systems which will jeopardize their future ability to feed themselves, but to ecological aid-integrated control programmes, and research and training in sustainable agricultural practices appropriate to local ecosystems.

All this of course will involve sacrifice by the industrial countries. It is likely that they will have to pay more for their raw materials, buy the plant products of the non-industrial world in preference to their own synthetics, be satisfied with smaller and less rapid returns from their industrial and agricultural aid, and often subsidize ecologically sound development strategies. This is what third world ecology means in terms of hard cash, which is ultimately all that governments are interested in, and Rs 103-9 are important for they are the nearest thing UNCHE gets to doing anything about it.

R103 is the most controversial of them all. It was passed by 72 votes to one, with eight abstentions, which in this case might just as well have been votes against. Unfortunately, it contains both good and bad clauses so that it is unlikely to be successful in its present form. The suspect clause appears to have been passed without comment, while the rather encouraging paragraph (b) was the one to receive the opposition of the industrial countries.

Paragraph (a) of the recommendation has three objects: to prevent governments using environmental concerns as a pretext for discriminatory trade policies; to ensure that non-industrial countries are not harmed by the environmental policies of the industrial countries; and to promote as a basic principle the statement that no country should solve or disregard its environmental problems at the expense of another. The first two objects are excellent, the third is not. It is obviously necessary to prevent governments using the environment as a catch-all for discrimination and as a means of short-changing the vulnerable nonindustrial countries. Equally, no country should disregard its environmental problems; but if countries are prevented from solving them at the expense of others of equivalent economic status, then unilateral action is made impossible. For example, the US would not be able to introduce its very sensible anti-pollution legislation because of its effect on the British automobile industry. Any anti-pollution legislation would have to await similar



measures in every other industrial country, which would make significant environmental improvements quite impossible.

Instead what is needed is special treatment for the non-industrial countries, as envisaged in paragraph (b):

Where environmental concerns lead to restrictions on trade, or to stricter environmental standards with negative effects on exports, particularly from developing countries, appropriate measures for compensation should be worked out within the framework of existing contractual and institutional arrangements and any new such arrangements that can be worked out in the future.

Yet characteristically it was this paragraph which was described as "unacceptable" by the US delegation, since its Government is opposed on principle to compensating nations for declines in their exports, regardless of cause. Canada, Japan, and Switzerland also declared they were opposed to compensation, and the UK and Sweden condemned the paragraph as "inappropriate and unworkable". These rich countries seemed to share Sweden's loftily cynical attitude, as expressed by the Swedish Minister of Agriculture, Ingemund Bengtsson. Sweden, he said, is not prepared to provide additional aid to non-industrial countries so that they can introduce environmental protection measures. Sweden, will be glad, however, to tell them what to do to avoid making her mistakes.

One of the things which paragraph (f) of R103 advocates is the promotion of natural as opposed to synthetic products. This is taken up in greater detail in R106, another one to provoke a certain amount of rich country hostility. though it fared much better than a similar motion at the UNCTAD Conference in Santiago. It recommends that the extent to which pollution could be reduced by replacing synthetic products and substitutes with natural products from non-industrial countries be examined. It further recommends that the Governments of these countries "consider fully the new opportunities that may be offered to them to establish industries and/or expand existing industries in which they may have comparative advantages because of environmental considerations". Finally it recommends that the Secretary-General undertake "a full review of the practical

implications of environmental concerns in relation to distribution of future industrial capacity and, in particular, to ways in which the developing countries may be assisted to take advantage of opportunities and to minimize risks in this area".

Although there would be impossible problems if we substituted natural for synthetic products without controlling overall production, these are thoroughly good and practical recommendations, and certainly do not deserve the US delegation's slur that they are "unfeasible and of little practical value for policy guidance". On the contrary, they contain most of the elements for reducing the development gap between the industrial and non-industrial worlds without imposing on the latter a pattern which would ruin its environment and the wellbeing of its peoples. Unlikely though it might seem to the governments of Europe and North America it would probably do them a lot of good too.

R108 recognizes that technologies for protecting and improving the environment should be employed universally, and therefore suggests that studies be made as to how non-industrial countries can convert to them without incurring burdensome costs. Subsidies are the obvious answer, but doubtless some study is required to reach it.

The key sentence of R109 is the last one, described as "too broad" by the UK, which states that the flow of assistance from industrial to non-industrial countries should be adequate to meet the additional environmental requirements of the latter.

Supporting measures

The main supporting measure of interest, apart from the suggestion in R97 that 5 June be designated World Environment Day (The Ecologist will give a prize for the most ludicrous government activity to mark it), is R17. This recommends a special fund for housing and the improvement of human settlements in pon-industrial countries. It was proposed by India and Libya on the grounds that the greatest environmental problem faced by nonindustrial countries is not pollution but poverty. It split the Conference along what today is the only international division of significance-not east west but north south. The main objection by the industrial countries was for once not doctrinaire opposition to compensation, losing trade, or simply spending money, but a reluctance to create yet another fund in addition to the Environment Fund, one of the three divisions of the celebrated Organ.

The Environmental Organ

The Environmental Organ consists of the Fund, the Secretariat, and the Governing Council. The Fund is to finance "wholly or partly" the entire Action Plan as well as any other international environmental activities agreed to by the Governing Council. It is explicitly stated that "due account should be taken of the special needs of the developing -countries", which suggests there is no need for the special housing fund. Unfortunately, the Fund is going to be extremely small. The US has decreed that it must not exceed \$100 million over five years, to which she will contribute not more than 40 per cent. In the words of a US policy document, this \$20 million a year will be "inadequate to launch all appropriate programmes simultaneously. Consequently, priorities will have to be established among programmes as no additional US support is forseeable at this time". The US agreed to contribute \$40 million over five years, Japan \$10 million, Canada \$5-7.5 million, Sweden \$5 million, Australia \$2.5 million, and Holland up to \$1.5 million. Twelve other countries including the UK also agreed to support the Fund though they did not specify by how much.

The Secretariat, which is to be headed by an Executive Director, is subject to a Governing Council of 54 nations, elected for three year terms on the basis of equitable geographical distribution. It is charged with coordinating the environmental programmes of the UN agencies, reviewing and assessing the effectiveness of the Action Plan and other international environmental programmes, advising Governments and international bodies, and making proposals relevant to environmental planning. It must also administer the Fund; yet although a powerful alliance of the UK, the US, Canada, and Sweden wanted the Secretariat to be financed by the Fund itself, the majority, led by France and India, ruled that it should be financed instead out of the regular budget of the UN. This means not only that the Secretariat will lose the independence it needs to operate effectively, but also that probably it will be very short of money. The regular budget has been frozen by Secretary-General Waldheim as the UN is virtually bankrupt. It is therefore most important that the General Assembly reverse this decision.

The Declaration on the Human Environment

The Declaration on the Human Environment caused more excitement than any other aspect of the Conference. There is not space enough to go into all the arguments about the preamble and principles which so dominated the occasion. The ten issues of the daily newspaper, *The Stockholm Conference Eco*, produced by Friends of the Earth and the *Ecologist*, give a blow by blow account, and make enthralling reading. (A limited number of sets are still available from the *Ecologist*, price £1.)

The Declaration is quite as important as the fuss about it suggests, because it provides both a guideline to what nations have agreed should be their common approach to environmental and related social problems and the first step towards international legislation.

Its heart is in the 26 principles. Originally there were 23, but the Conference added four more and substantially changed the rest, as can be seen from the following pages. Generally, the changes and additions are great improvements on the original, but the reader may judge for himself.

There should have been 27 principles, but UNCHE just could not agree to this one:

"Relevant information must be supplied by States on activities or developments within their jurisdiction or under their control whenever they believe, or have reason to believe, that such information is needed to avoid the risk of significant adverse effects on the environment in areas beyond their national jurisdictions."

Since this is seen by the more blinkered countries as a threat to their national sovereignty it caused a storm. Brazil in particular was outraged, and proposed the following amendment:

"No State is obliged to supply information under conditions that, in its founded judgement, may jeopardise its national security, economic development or its national efforts to improve environment."

This of course is a licence for laissez-

faire and directly contrary to the spirit of UNCHE. By contrast, enlightened African countries (Algeria, Burundi, Cameroun, Congo, Egypt, Guinea, Kenya, Libya, Mauretania, Senegal, Sudan, Tanzania, and Zambia) proposed an amendment that would actually strengthen the principle by deleting the words "they believe, or have reason to believe, that" and "significant". The principle has been referred to the General Assembly for a decision, and hopefully it will have the wisdom to adopt it as amended by the Africans.

UNCHE agreed to the other principles by acclamation, subject to reservations by certain countries on the following: Principle 1—by South Africa, who objected to the reference to *apartheid*; Principle 2—by Uruguay, who stated that it was necessary to maintain the balance and ensure the rational exploitation of ecosystems as a whole, and therefore much more than "representative samples" must be safeguarded; Principle, 12—by the USA, who declared that it "does not regard the text of this principle, or any other language contained in the Declaration,



as requiring it to change its aid policies or increase the amounts thereof"; and Principle 26—by Tanzania and China, who thought it should be put much more vigorously and specifically condemn the use of chemical and biological weapons.

Where do we go from here?

It is generally agreed that Stockholm was a success. Concern for the environment is relatively recent and an appreciation of the underlying causes still more so. Although a number of the more important recommendations have been weakened or destroyed by shortsighted amendments, many more remain intact.

Hopefully, the recommendations listed in this article will emerge from the General Assembly strengthened or at least untouched. Better still, those which have been weakened might have their original force restored. Delegates to the UN should have this in mind, and should certainly resist any further waterings down. Doubtless, many of the countries which opposed recommendations at Stockholm will continue to oppose them in New York, and there is a real danger that those who abstained will vote against, while some of those who voted for will abstain. Graham Searle's article which follows illustrates this dangerous fickleness of governments.

Yet even if all the contentious recommendations go through, will it make any difference to those who oppose them? Sadly, this is most unlikely. A special resolution was passed by UNCHE calling on all states to abandon their plans to test nuclear weapons. This was aimed primarily at France, yet although it was passed by 56 votes to 3 (China, France, and Gabon voting against), France went ahead with her tests in the Pacific. Of course she had the tacit approval of 29 abstaining countries (including the UK and US), but what is most depressing is the French statement that they would "not be bound in any way by a recommendation against which we have voted".

This is where Stockholm is likely to fail. The magnificent aid and compensation recommendations will come to nothing simply because the industrial countries will not comply with them. Both the US and UK have explicitly said so, Peter Walker, the UK Secretary of State for the Environment, clarifying the issue with the statement: "I don't think the UN would last very long if every majority vote were taken to be binding on every nation."

In its last session UNCHE recommended a second conference to which both Canada and Mexico offered to act as host. Whether it is held or not, there are still a number of important issues with which nations must get to grips. Principally these are: the need for nations to agree to a less rigid interpretation of national sovereignty, so that the tragedy of the commons on a global scale can be averted; and the need for an international system of equitable resource allocation. If nations continue to act as selfishly and shortsightedly as Mr Walker expects them to, then we would be wiser to abandon all further conferences and colloquia. If the UN cannot give hope to people in love with life, there is only one thing for it. Take to the hills.

Coming events

17 October—at 7.30 pm. United Nations Association and Women's International will be held in the Adult Education Centre, League for Peace and Freedom. A meeting Union Place, Worthing. Subject: Survival. Speaker: Brian Johnson (Fellow Institute Development Studies Sussex University, Consultant to Sec Gen of Stockholm Conference on the Environment, Associate Editor Ecologist, co-author Blueprint for Survival, etc). All welcome.

26 October-7 September '73—International Course in Environmental Science and Technology 1972/1973. Post graduate course to take place in the building of the International Courses in Hydraulic and Sanitary Engineering at 95, Oude Delft, the Netherlands. Further details: E. Jongens, Head of Dept. of International Education, NUFFIC, Molenstraat 27, Den Haag—2003.

3-9 November—Third International Sewage and Refuse Engineering Exhibition IFAT 72 to be held in conjunction with the 2nd European Sewage and Refuse Symposium (EAS), in the buildings and outdoor display areas of the Munich Theresienhöhe exhibition grounds daily from 9 a.m. to 6 p.m. Enquiries: Scientific Committee EAS 72, Kongreßbüro, Münchener Messelund Ausstellungsgesellschaft mbH., D-8000 München 12, Theresienhöhe 15.

13-17 November—Environment '72. Conference and exhibition on total environmental protection to be held at the Royal Horticultural Society's New Hall in Westminster. Further details: Eric Anderson and Associates 87, Chancery Lane, London WC2. Tel. 01-242 0991.

3-5 January—Atmosphere and Man—The Year 2000 and Beyond. A Conference-Teach-in to be held in London on the damage to the atmosphere and the consequent harm to the biosphere, i.e. its relation to other ecological problems. Further details: Professor R. S. Scorer, Dept. of Mathematics, Imperial College, London SW7.

United Nations Declaration on the Human Environment: Principles

These principles express the consensus of the nations present at Stockholm on socio-ecological issues. As such, they represent a considerable improvement on the original draft. Apart from minor editorial changes, alterations and additions by UNCHE are printed in *italic*. Some of the principles are entirely in italic, either because they have been entirely rewritten or because they are completely new. This is specified in brackets.

Principle 1

Man has the fundamental right to freedom, equality and adequate conditions of life, in an environment of a quality that permits a life of dignity and wellbeing, and he bears a solemn responsibility to protect and improve the environment for present and future generations. In this respect, policies promoting or perpetuating apartheid, racial segregation, discrimination, colonial and other forms of oppression and foreign domination stand condemned and must be eliminated.

Principle 2

The natural resources of the earth including the air, water, land, flora and fauna and especially *representative samples of* natural ecosystems must be safeguarded for the benefit of present and future generations through careful planning or management, as appropriate.

Principle 3

The capacity of the earth to produce vital renewable resources must be maintained and, wherever practicable, restored or improved.

Principle 4 (new)

Man has a special responsibility to safeguard and wisely manage the heritage of wildlife and its habitat which are now gravely imperilled by a combination of adverse factors. Nature conservation including wildlife must therefore receive importance in planning for economic development.

Principle 5

The non-renewable resources of the earth must be employed in such a way as to guard against the danger of their future exhaustion and to ensure that benefits from such employment are shared by all mankind.

Principle 6

The discharge of toxic substances or of other substances and the release of heat, in such quantities or concentrations as to exceed the capacity of the environment to render them harmless, must be halted in order to ensure that serious or irreversible damage is not inflicted upon ecosystems. The just struggle of the peoples of all countries against pollution should be supported.

Principle 7 (new)

States shall take all possible steps to prevent pollution of the seas by substances that are liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea.

Principle 8

Economic and social development is essential for ensuring a favourable living and working environment for man and for creating conditions on earth that are necessary for the improvement of the quality of life.

Principle 9

Environmental deficiencies generated by the conditions of underdevelopment and natural disasters pose grave problems and can best be remedied by accelerated development through the transfer of substantial quantities of financial and technological assistance as a supplement to the domestic effort of the developing countries and such timely assistance as may be required.

Principle 10 (new)

For the developing countries, stability of prices and adequate earnings for primary commodities and raw material are essential to environmental management since economic factors as well as ecological processes must be taken into account.

Principle 11

The environmental policies of all States should enhance and not adversely affect the present or future development potential of developing countries, nor should they hamper the attainment of better living conditions for all, and appropriate steps should be taken by States and international organizations with a view to reaching agreement on meeting the possible national and international economic consequences resulting from the application of environmental measures.

Principle 12

Resources should be made available to preserve and improve environment, taking into account the *circumstances and* particular requirements of developing countries and any costs which may emanate from their incorporating environmental safeguards into their development planning and the need for making available to them, upon their request, additional international technical and financial assistance for this purpose.

Principle 13 (rewritten)

In order to achieve a more rational management of resources and thus to improve the environment, States should adopt an integrated and co-ordinated approach to their development planning so as to ensure that development is compatible with the need to protect and improve the human environment for the benefit of their population.

Principle 14

Rational planning constitutes an essential tool for reconciling any conflict between the needs of development and the need to protect and improve the environment.

Principle 15

Planning must be applied to human settlements and urbanization with a view to avoiding adverse effects on the environment and obtaining maximum social, economic and environmental benefits for all. In this respect projects which are designed for colonialist and racist domination must be abandoned.

Principle 16

Demographic policies, which are without prejudice to basic human rights and which are deemed appropriate by Governments concerned, should be applied in those regions where the rate of population growth or excessive population concentrations are likely to have adverse effects on the environment or development, or where low population density may prevent improvement of the human environment and impede development.

Principle 17

Appropriate national institutions must be entrusted with the task of planning, managing or controlling the environmental resources of States with the view to enhancing environmental quality.

Principle 18

Science and technology, as part of their contribution to economic and social development, must be applied to the identification, avoidance and control of environmental risks and the solution of environmental problems *and for the common good of mankind*.

Principle 19

Education in environmental matters, for the vounger generation as well as adults, giving due consideration to the underprivileged, is essential in order to broaden the basis for an enlightened opinion and responsible conduct by individuals, enterprises and communities in protecting and improving the environment in its full human dimension. It is also essential that mass media of communications avoid contributing to the deterioration of the environment, but, on the contrary, disseminate information of an educational nature, on the need to protect and improve the environment in order to enable man to develop in every respect.

Principle 20 (rewritten)

Scientific research and development in the context of environmental problems, both national and multinational, must be promoted in all countries, especially the developing countries. In this connexion, the free flow of up-to-date scientific information and transfer of experience must be supported and assisted, to facilitate the solution of environmental problems; environmental technologies should be made available to developing countries on terms which would encourage their wide dissemination without constituting an economic burden on the developing countries.

Principle 21

States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.

Principle 22

States shall co-operate to develop further the international law regarding liability and compensation for *the victims of pollution and other* environmental damage caused by activities within the jurisdiction or control of such States to areas beyond their jurisdiction.

Principle 23 (new)

Without prejudice to such criteria as may be agreed upon by the international community, or to standards which will have to be determined nationally, it will be essential in all cases to consider the systems of values prevailing in each country, and the extent of the applicability of standards which are valid for the most advanced countries but which may be inappropriate and of unwarranted social cost for the developing countries.

Principle 24

International matters concerning the protection and improvement of the environment should be handled in a cooperative spirit by all countries, big or small, on an equal footing. Co-operation through multilateral or bilateral arrangements or other appropriate means is essential to effectively control, prevent, reduce and eliminate adverse environmental effects resulting from activities conducted in all spheres, in such a way that due account is taken of the sovereignty and interests of all States.

Principle 25

States shall ensure that international organizations play a co-ordinated, efficient and dynamic role for the protection and improvement of the environment.

Principle 26

Man and his environment must be spared the effects of nuclear weapons and all other means of mass destruction. States must strive to reach prompt agreement, in the relevant international organs, on the elimination and complete destruction of such weapons.

Whaling station, Hvalfjordur, Iceland. Photo: Valerie Searle.

Telling Whoppers

by Graham Searle

As noted in the preceding article, the success of Stockholm depends on the treatment of its recommendations by the General Assembly in New York. Voting by the International Whaling Commission on the moratorium on the commercial hunting of whales agreed at Stockholm provides us with the only test of what is likely to happen. The outcome is depressing. The moratorium was rejected because six out of the thirteen nations also present at the UN Conference abandoned their Stockholm positions. Graham Searle is Director of Friends of the Earth Ltd. London.

On 10 June, in Committee Two at the UN Conference on the Human Environment, people representing sixty-six nations of the world talked about their relationship with whales. The debate (as everyone will have read) centred around a US Amendment which advocated:

1) a strengthening of the International Whaling Commission,

- 2) an intensive Cetacean research programme, and
- 3) a ten year moratorium on the commercial hunting of whales.

When the matter came to a vote, 51 nations were in favour of the package, three were against and 12 abstained. When the decision was later referred to the plenary session, the moratorium proposal went through on the nod, 53 nations voting in favour with three abstentions and no votes cast against.

On 30 June in the plenary session of the 24th Annual Meeting of the International Whaling Commission, people representing 14 nations of the world also talked about their relationship with whales. The debate again centred around a US resolution which advocated the imposition of a ten year whaling moratorium. The proposal was defeated with six votes against, four in favour and four abstentions. To have been implemented, the resolution needed a three-quarters majority.

This, then, was the outcome of the first of the Stockholm resolutions to be put to the test, and these votes have quite rightly assumed an unrivalled importance in everyone's assessment of the effectiveness of UN Conference resolutions. These votes require analysis and raise a number of interesting questions. Firstly, there are a number of differences between the Stockholm Conference (and the attitude of governments there) and the IWC. The UN meeting brought together delegations from over a hundred nations representing peoples with differing and often conflicting interpretations of what makes ecological sense: the IWC is representative of only 14 nations, all of whom (even the USA for the present) have an interest in whale hunting or in the use of whale products. Furthermore, the Stockholm Conference was a public affair, with the world's press present at both Committee and Plenary sessions. The IWC by contrast was private. When the USA proposed that the meeting be opened to the press, she couldn't even find a seconder.

Incidentally, the IWC also broke faith with Friends of the Earth when it failed to honour its promise to consider the position of the Press for future meetings. The Chairman explained that by some oversight, this matter had not appeared specifically on this year's agenda, this "technicality" resulting in the IWC being unable even to discuss it. It is against this backcloth of obsessive secrecy which the IWC must be examined.

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Governments sometimes appear to behave in public rather like spoilt children in the presence of maiden aunts. However naughty they might be at home, if there is praise or an ice cream to be had at Auntie's house, the malevolent child becomes interesting, attractive, even good. All of which of course is fine, as long as promises so freely made are actually kept. When Maurice Strong (the best Auntie a UN Conference ever had) invited hundreds of nephews and nieces to Stockholm, he must have been fully aware of the gathering's limitations and could hardly have been surprised when so many of the family promised faithfully not to bully their cousins, the whales.

The fifty one Committee Two nations who made the promise included at least eight members of the IWC: the USA, UK, Mexico, Argentina, France, Denmark, Norway and Canada were all going to be good. Australia didn't know, so she abstained. Japan and South Africa were determined not to yield to their auntie's cajolings and said they were going to carry on killing whales. The other two IWC member nations, Iceland and Panama, (according to their Embassies in London) can't remember which way they voted. So at Auntie's house, 8-10 children were good; 2-4 were naughty, and 1-3 were confused.

The question now remains-how many told the truth and how many lied? Of the 14 nations in the IWC meeting only four voted for the moratorium. Mr Russell Train, head of the US Delegation told pressmen who these were: the USA, UK, Argentina and Mexico. The six voting against were Japan, USSR, Norway, Iceland, South Africa and Panama. Canada, Australia, Denmark and France abstained. Of the 11 countries, the Stockholm positions of which are known, seven voted consistently when they attended the IWC meeting; Japan and South Africa still wanted to kill whales, but at least had been honest about it; the USA, UK, Mexico and Argentina still wanted the moratorium; Australia again abstained. Iceland and Panama voted against the moratorium at the IWC, but had not voted against in Stockholm, where they either voted in favour or abstained. The USSR voted against the moratorium at the IWC and did not attend the UN Conference. Canada, Denmark and France voted in favour of the moratorium in Stockholm, but abstained in London. Norway voted in favour in Stockholm, but against it at the IWC, after which the head of their delegation (and incidentally the next Chairman of the IWC) is reported to have received a reprimand from his government.

The lesson to be learned from these vote patterns is simply that when the eyes of the world are firmly fixed on our representatives, they and their governments generally behave better than they do in private. If ever there was an argument for opening up meetings of the IWC, this is it. If the last IWC meeting had been an open one and if countries had been consistent in their attitudes, the vote on the moratorium would at worst have been-8-3 in favour (abstentions not being counted) and could have been 10-3. For the necessary majority to have been achieved, a vote of 9-3 was needed. The moratorium failed because six nations welched on their Stockholm votes. These were: Iceland, Panama, Norway, Canada, France and Denmark. We owe them no respect.

The Tibetan Farm School has an immediate vacancy for an experienced farmer who can be trained as a future Chief Instructor. His duties will include:

- (a) Assistant to the Project Director in soil, crop and animal management
- (b) Instruction in various branches of agriculture and horticulture according to his ability
- (c) Standing in for the Project Director from time to time when he will be required to take full responsibility for routine management and instruction.

The qualities required of the successful candidate are:

- (a) Must have the ability and will to become deeply involved in the Tibetan refugee problem in general and the Farm School project in particular.
- (b) Must have a sound knowledge and experience of the principles of good soil husbandry, crop husbandry and animal management.
- (c) Must be fundamentally an organic farmer, although he need not be dogmatic.
- (d) Must be able to lecture to small classes on farming subjects.
- (e) Experience with horses will be extremely valuable.
- (f) Skill in one or more manual crafts will be valuable.

The post carries a modest salary, to be negotiated according to skill and experience.

A small farm cottage is available.

Applicants should apply in their own hand-writing, giving full particulars of experience together with two references.

BOX No. E166 The Ecologist

Godric E. S. Bader, the chairman, and Ernest Bader (right) the founder of the Scott Bader Commonwealth.

A Blueprint Applied

Twenty years ago Ernest Bader, successful industrialist, Christian and visionary, decided that he had no wish to continue to impose on others the frustrations of the employer-employee relationship. He established the Scott Bader Commonwealth, today the country's leading example of participatory industrial democracy

When you arrive at the factory there is nothing about it that strikes you as unusual. It is in the village of Wollaston, in Northamptonshire, in a 45 acre estate surrounding Wollaston Hall, a manor house that has been converted into offices in such a way as to preserve the exterior of the building and much of the interior as well. The laboratories and factory buildings are sited to the side and rear of the house, partly screened by trees. The grounds are well groomed. People go about their business, busily. It could be any light industrial establishment.

The first suggestion of something

different is a peace poster on a notice board close to a car park. There are more posters in the Assembly Hall, used as a canteen. These bear slogans attacking capitalism. Their presence could be explained by the existence of a radical group among the workers. What would be more difficult to explain is the fact that the slogans were written by the factory's founder. He does not own the factory any longer: the workers do. They have done for the last 20 years.

The factory belongs to the Scott Bader Commonwealth. The business was started in 1920 by Ernest Bader. It grew and became successful. During the Second World War it moved to its present site and by the end of the war Mr Bader was a rich man. Yet he was not satisfied. He believed that as he grew richer, the gulf between his employees and himself would widen, to the detriment of both. He saw the pursuit of material gain-Mammonas the close ally of war-Mars. He is 81 years old now and spends his time reading, writing, thinking, talking and meeting what, under a different system, would have been his workers. He talks a great deal about Mammon and Mars. He is a Quaker, a deeply committed

by Michael Allaby

Christian pacifist, and although he had stipulated that no product he made should be used for military purposes, this was not enough. He had started the business to escape the frustrations of life as an employee; now he had become an employer and was inflicting upon others these very same frustrations. What must be broken, he decided, was the artificial employeremployee relationship. The only way to do this was to create a new, communal form of ownership within which there would be only workers, and all would be partners.

The Commonwealth

He believes that men should employ capital, rather than capital employ men. He sees himself as being in the tradition of Robert Owen, the 19th century factory-owner-reformer who sought to improve the lives of his workers in Lanarkshire, but failed. Ernest Bader has had more success.

In 1951 he transferred 90 per cent of the shares in the company to his employees. At this stage, however, the Bader family still retained control. In 1963 the remaining shares were transferred and control of the company was vested in a board of trustees represent-

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ing the Scott Bader Commonwealth Everyone over 21 years of age who has worked there for 12 months can become a member of the Commonwealth. There have been minor modifictions, but essentially this is the structure today. Ernest Bader's son, Godric, deeply convinced of the validity of the Commonwealth concept, is chairman for as long as he remains a director. His successor's appointment will be confirmed by the members. Meanwhile his shareholders are all about him and they can (and do) approach him at any time.

The size of the Commonwealth is restricted. Ernest Bader calculated that there is an upper limit to the number of individuals who can take part in a viable participatory democracy. At present there are rather less than 400 members and there will be no major increase. Should the development of the business make such an increase desirable, the constitution requires that the problem be solved by the creation of another Commonwealth, somewhere else.

The history of industrial relations in Britain being what it is, claims to having established a genuinely democratic form of control must be received with some caution. Is this no more than a facade to conceal a heavyhanded kind of paternalism? Is it possible that workers can truly influence major policy decisions?

It is possible. The manufacturing company is wholly owned by the parent company, which is the Commonwealth, and all of its shares are held by the Commonwealth. Since no shares are sold outside there can be no possibility of a takeover. The members elect a 16 member Community Council. The Council is represented on the Board of Directors and it has power to approve or disapprove all appointments to the Board. It must approve the appointment of a chairman and it must approve the salaries of all Board members. It is laid down in the constitution that no salary shall exceed that paid to the lowest-paid member by a ratio of more than 1:7. Since the members are partners, not employees, they cannot be dismissed except for extreme misbehaviour. They can, of course, resign voluntarily at any time. The disposal of the company's profits is laid down, too. A minimum of 60 per cent is re-invested, up to 20 per cent is donated to charities designated

by the Commonwealth and 20 per cent is shared equally among members as a bonus.

Participating in a democracy

It works both ways, of course. If participatory democracy is to succeed, then its members must participate. Members of the Scott Bader Commonwealth are expected to play their part in making the system work. There is a Code of Practice to which each of them subscribes. It requires that "since management by consent rather than coercion is an appropriate style for the Company, a corresponding effort to accept responsibility is required from us all. This will show in a desire to attend meetings and to participate in the affairs of our community; it will show in increased communication between person and person and between groups and department; it will show in an effort to understand the problems encountered and the contribution made by those in other areas of our organisation: above all it will be seen as a genuine willingness to learn, to develop and grow". Members "recognise that there are some members in a position of authority. Such members have a greater opportunity, and hence a special responsibility to facilitate the development of jobs which are capable of fulfilling us as people; to act as 'catalysts of common effort' and not as authoritarian 'bosses'." Members agree to share work with others in the event of a down-turn in trade, rather than declare their fellows redundant. They agree that, "as the foundation of our Commonwealth abolished here the power of share ownership, so we shall strive to discourage our money from being used to profit from other people's work or to control other people's lives". This is taken very seriously. From time to time decisions must be taken which might mean increasing the labour force. A major factor in reaching the decision is the likelihood of future availability of work for new members who cannot be laid off. At the same time, if the alternative is to put out work to contractors, equal care is taken to ensure that the contractor is not placed in a position where he has to declare workers redundant. They will not evade responsibility and their concern for their fellows extends to those working for other organisations. It extends to the wider community of the village as well.

The Code of Practice recognises "that we have a responsibility to the society in which we live and believe that, where we have some special talent or interest, we should offer this to the wider community. Thus most of us are engaged in some form of social, political or public service, however small".

The products

Scott Bader manufactures polyester resins. plasticisers and emulsion polymers. There are some 150 products in all and they are supplied in their liquid form to make everything from boats to paints and fabrics. There are many boats made with Scott Bader resins; a number of them took part in The Observer Single-Handed Trans-Atlantic Race. The largest GRP yacht in the world, Vendredi XIII, was made with Scott Bader resins and in Peru they are being used to build 93 ft trawlers. Sometimes the company designs the finished product and supervises its construction. One of the company's subsidiaries, RP Structures Ltd, designed, supervised the construction of and erected large, heavy-duty reinforced plastic covers for water tanks. The problem was that the installation of any other type of cover would have meant emptying the tank so that men could work inside. The RP Structures cover was built in sections, assembled on site and lifted into position. All the work was done outside the tank and, this advantage apart, the plastic covers are cheaper than their nearest rivals (which are made from steel) and, of course, being GRP, they are corrosion-resistant.

The team which designed them is allowed a considerable degree of freedom. This is another feature of the Commonwealth: like a number of other small groups it operates as a semi-autonomous unit within the larger organisation. Creative workers are given wide scope to exercise their talents. This is important, for Scott Bader has a reputation for innovation. It cares about the uses to which its products are put and it is engaged in a perpetual search for new applications. The technique for building covers for water tanks might be applied to food storage bins for developing countries.

The Christian ethic

The Christian ethic that was laid down

Above: Wollaston Hall., Right: Vendredi XIII, at 128 ft. the largest GRP boat in the world. Below: The Commonwealth Centre.

by Ernest Bader is evident throughout the organisation. He wrote recently:

"I am convinced that the new Society we are building must not be based on coercion and force; it must be free from such tensions, and this can only be achieved through freedom to follow the dictates of one's own conscience. We cannot profess faith in one thing and be forced to do another without losing our peace of mind. What is morally wrong cannot be politically right. The State cannot be allowed to force us to do what we consider a crime, namely to participate in war and the 'rat race'. In any case, we detest the idea of making profits out of the misery of others, and while supplying goods which also have a peacetime purpose, we refuse orders for the manufacture of weapons of war."

This philosophy has been taken up by members who have developed a Code of Practice which is extended to include protection of the environment:

"We are agreed that our social responsibility extends to:

1. Limiting the products of our labour to those beneficial to the community, in particular excluding any products for the specific purpose of manufacturing weapons of war.

2. Reducing any harmful effect of our work on the natural environment by rigorously avoiding the negligent discharge of pollutants.

3. Questioning constantly whether any of our activities are unnecessarily wasteful of the earth's natural resources."

It cannot have been easy in the early days. There were many who believed the vision of Ernest Bader was a foolproof recipe for bankruptcy and it would be naive to overlook the fact that it could have gone wrong and failed. Yet it succeeded commercially. In 1951, when it was founded, the company had an annual turnover of £625,000. In 1971-72 its turnover was £5.2 million. It has raised capital for investment without having to sell its shares on the open market. Now the profit that is ploughed back is investment enough.

Trades unions have shed some of the mistrust which existed against the common ownership ideals of Scott Bader. Bob Edwards MP has been a trustee of the Commonwealth for nine years. He is General Secretary of the Chemical Workers Union and a National Officer of the Transport and General Workers Union. There is an active branch of the TGWU in the firm, but not in its traditional function. The Institute of Workers Control and Rank and File Trade Union Organisation invited the Commonwealth to sit on its first council.

ICOM

The Scott Bader Commonwealth was the first and is the most advanced industrial democracy, but it is not unique. There is an Industrial Common Ownership Movement. Its meminclude Landsman's bers (Coownership) Ltd, a Huntingdonshire firm manufacturing caravans; Rowen (Onllwyn) Ltd, in South Wales, manugarden furniture facturing and employing disabled miners; Rowen Engineering Ltd, of Glasgow, which makes electrical heaters; Trylon Ltd, a Scott Bader protegé in its early life, which makes plastic canoes and retails polvester resins; Michael Jones, a retail and manufacturing jeweller in Northampton; and there is, of course, The John Lewis Partnership.

The Treasurer of ICOM, John Anagnostelis, who is also Secretary of the Scott Bader Commonwealth, believes that unless industrial violence is minimised rapidly, if not completely eliminated, world peace is virtually impossible. He has defined what he sees as the role of industry:

"Industrial enterprises should unshackle themselves from the simplistic economic-only task. The proposals would be for: (a) a techno-economic task, which is to produce products, but also be involved in innovation, particularly in the areas of recycling precious raw materials and not waste them in various forms of pollutants. We have for a long time used this earth's natural resources as income rather than irreplaceable capital.

"(b) A social task which would involve the development of working people to their full potential, rather than regard them as expensive substitutes for machines. This task is also concerned with the preservation of the environment (such as it is), and since war is an anti-social habit, the nonmanufacturing of materials for war purposes.

"(c) Political task, which would be used by enterprises successful in the other tasks to tell the rest of the industrial community of their success in the hope of imitation."

A Blueprint applied

A Blueprint for Survival was well received by both Ernest and Godric Bader. They welcomed it as evidence that the ideas they have been applying for 20 years now attract impressive support. At the same time, their success demonstrates the validity and practicality of many of the Blueprint proposals. Scott Bader is decentralised. ICOM has suggested that the very large corporations would benefit from a large dose of decentralisation. The size of the community is restricted to the maximum number of individuals among whom participatory democracy can work. Interestingly, the figure of around 400, which they have proposed. is very similar to the communities of 500 suggested in the Blueprint. Leadership is by consent rather than by coercion. The products they manufacture are intended to benefit, never to harm, mankind, to improve rather than reduce man's chances of survival. The Community is integrated into the wider community outside, within which its members play an active and responsible role. The demonstration is all the more convincing since the Commonwealth was conceived quite separately from the Blueprint, many years before that paper was written. It is most convincing of all in that it seems to work. Its members, on the whole, are happy and fulfilled; its products are good; economically it is viable. Ernest Bader would say that above all it demonstrates the practical application of Christian principles:

"The experience gained during many years of effort to establish the Christian way of life in our business has been a great encouragement; it has brought us good results in our relations with one another, as well as in the quality and quantity of our production. Now we wish to press on and consummate what we have so far achieved, making a concrete contribution toward a better society in the service of God and our fellow men."

The Commonwealth which Ernest Bader founded will develop further and its example may encourage others to follow. They should follow, for Scott Bader has established the pattern for a form of industrial society that is immediately relevant to the needs of many areas of the world and that may offer our industrial civilisation its best hope of enduring into the 21st century.

Development and Disease in Africa

by Charles C. Hughes and John M. Hunter

This is the second part of the article, "The role of technological development in promoting disease in Africa", the first part of which was published in last month's *Ecologist*.

Rural malnutrition

Many traditional African diets provide an excellent and well-rounded nutritional regime, especially where there is no population pressure and no cashcropping. For example, the Karamojong of Uganda possess many cattle, which are the mainstay of their social and economic life. Sorghum, milk and blood are the main foods and meat is eaten in times of famine. In this situation, protein-calorie malnutrition is rare (Jelliffe et al., 1964). The Mabaans occupy the bush country in the southeastern part of Sudan near the Ethiopian border, and they, too, have an excellent nutritional status; there are no nutritional deficiencies. Their major foods, all rich in protein, are guinea fowl, rodents, game, millet, sorghum, nuts, and dried fish (Rosen et al., 1962). In short, many indigenous diets are good diets which include a high proportion of protein-rich foods. Considerably more research, however, is needed in this area (Jelliffe, 1955).

On the other hand, it should also be noted that in numerous cases culturallybased food taboos prevent consumption of animal protein which is available for either an entire group or for special classes of persons in the group. These food taboos play a part in denying children some of the vital nutritional elements required. In the Ankole area of Uganda, for example, many weaned children are deprived of goat's milk because the goats are not used for this purpose; of eggs, because they are believed to be unsuitable for human consumption; and of meat and fish, or even an adequate quantity of cow's milk, because of the expense. The value of vegetable protein, as in beans, peas, and ground nuts, is likewise not appreciated (Cook, 1966).

The introduction of cash crops in the colonial period often led to the neglect of traditional diets and proper food production. In many African countries, a high proportion of the men engaged in farming are still concerned primarily with cash-crop production, and the vigorous efforts to increase cash-crop yields have often been at the expense of subsistence farming. This is observable, for example, in the cocoa and coffee-growing districts of West Africa, where the best lands are used for cash-crop purposes. In many areas such a con-

centration on cash-crop production has reduced the quantity of locally produced food. Meanwhile, income derived from cash crops is subject to wide fluctuations and is not in every case wisely spent or wisely spread out. Lump sums derived from bulk sales tend to be quickly spent on items such as education fees or clothes and status symbols, leaving little for food purchases (Hendrickse, 1966). In this connection, a study of the effects of cocoa production in West Africa are pertinent.

Economically, the most important finding for the country which came out of our survey concerns the cocoa villages. Cocoa is one of the best cash crops in the world, giving the highest cash yield for the smallest energy output. One might therefore expect the cocoa villagers to be well off, well fed, happy and gay. We found exactly the reverse. The people were dull, apathetic and unhappy. Their villages were run down, dirty and dilapidated and their children naked, pot-bellied and sickly. The reason for this is that it is not enough to introduce a highly paying cash crop to an illiterate peasantry and expect them to profit by it. What happens is that it tends to kill their traditional life, merely putting money in their pockets for a short period in the year, during which time they enjoy themselves. When the money gets scarce, months before the next harvest, they find themselves short of everything. In a pure cocoa village they have given up most of their land for cocoa and are no longer able to till the ground for food... Hence, with their money running out they can only buy the cheapest of food, e.g. cassava and yam... At Igun (West Nigerian cocoa village) the villagers are apathetic, complaining if asked questions, and appear devitalized and sick. (Collis *et al*, 1962b, pp. 223-24).

Cash-crop production of mainly coffee and cotton in the Kilimanjaro District of Tanzania, mostly by the Chagga people, leads to some neglect of local diets. The main crops are bananas, pulses, maize and yams. The diet is very high in starch and, not surprisingly, kwashiorkor is the main form of protein-calorie malnutrition (PCM) found in this area. It is observable in 20 per cent of the children (Marealle and Kazungu, 1964). The real incidence of PCM will probably be much higher than the 29 per cent figure for kwashiorkor, since subclinical PCM and post-PCM cases should be taken into consideration for such an assessment.

There are other examples of deleterious effects on diet and nutritional health following government programmes. The Hadza are a small hunting and gathering tribe living in the tsetse-infested savanna adjacent to Lake Eyasi in northern Tanzania. It is believed that they may be related to the Bushmen of South Africa. Their diet consists of grain and gathered fruits, seeds and berries. Intercourse is forbidden during the prolonged lactations. At five months children are given bone marrow, seeds and pre-chewed meat. Overall, their nutritional status is excellent, and dental caries are almost absent. But tsetse clearance programmes are changing the ecologic and nutritional status of this group. Because of tsetse clearance, surrounding tribes are encroaching upon Hadza territory, and diet changes are inevitable. Corn meal, which can bring PCM and pellagra, is starting to make inroads on the diet (Jelliffe, Bennett et al., 1962).

The Lugbara, a large tribe living on both sides of the Congo-Uganda border, traditionally had a high-protein diet. Feeding and weaning of infants was satisfactory. The tribe had a high intake of beans, milk, peas, ground nuts, and sesame seeds; and their main food crops were millets and sorghum. Such a diet kept PCM incidence low. Following famines in the West Nile District, however, a law was introduced in 1950 requiring every householder to plant half an acre of cassava, a plant with very low protein content. The crop has now become a secondary staple, and if its cultivation further increases, as it may well do, the nutritional implications are obvious (Jelliffe, Bennett et al., 1962b). With mounting population pressure in rural areas, there is an inevitable tendency to change from protein-rich staples, such as millett and sorghum, to carbohydrate staples, such as cassava, yams and plantain. Areas of high rural population density are usually characterized by a dependence upon starchy staples, which yield more calories but less protein to the acre. For example, cassava produces four to five times the calories per unit area as does millet.1

Table 7-1 CALORIES PER HECTARE OF AFRICAN CROPS

However, from the nutritional point of view, protein supplies are vital. Comparative protein content of various African foods are shown in Table 7-2.²

Table 7-2

GRAMS OF PROTEIN PER 100 CALORIES

| | V/A6731 |
|--|---------|
| Dried fish | 15.3 |
| Soya (whole dry seed) | 11.3 |
| Beef | 9.6 |
| Beans or Peas | 6.4 |
| Ground nuts | 4.7 |
| Millet (Pennisetum) | 3.4 |
| Sorghum vulgare | 2.9 |
| Maize (whole meal) | 2.6 |
| Yams | 2.3 |
| Plantain | 1.0 |
| Cassava (fresh) | 0.83 |
| Cassava (flour) | 0.44 |
| and the second of the second state of the seco | |

In such areas with considerable dependence upon starchy staples lacking supplementation, PCM is usually found. For example, in the Kayonza District of Kigezi, Uganda, a densely populated area in which the major food staple is

¹Table from J. F. Brock and M. Autert, 1952. ²*Ibid.* plantain, a high incidence of PCM is found among the Bachiga children. This has occurred because of pressure on the land. (Jelliffe *et al.*, 1961).

When regional surveys of foodstuffs are taken into consideration with population density, they give a good indication of patterns of nutritional risks. In the Buganda region of Uganda, for example, there is a heavy dependence upon plantains (46 per cent), at the expense of cereals (11.3 per cent). pulses (9.7 per cent), and animal products (4.2 per cent). These figures express the percentage of total calories derived from the sources indicated. In Buganda therefore, protein intake is low, especially when compared to the northern region of Uganda, where total calories derived from cereals, pulses, and animal products were 39.3 per cent, 24.1 per cent, and 5.2 per cent respectively. While the protein intake in the northern region is much better, cassava has recently spread into northern Uganda and at present accounts for 24.2 per cent of total calories (Burgess, 1962).

The development of hybrids is often hailed as the agriculturists' answer to the problem of population increase. And although hybrids do produce spectacular increases in yields, it is sometimes the case that protein content in hybrids is lower than in unimproved varieties. For example, Japanese hybrid rice has a 5 per cent protein content (as compared to 10 per cent for other rice), and US hybrid maize has a 6 per cent to 8 per cent protein content (as compared to Nigerian or Brazilian maize with 10 per cent). Allowances should be made for these differences in rural development planning; in particular, the amino acid composition of those food crops selected for promotion in rural areas should be carefully considered.

Much of the acute rural poverty on the South African reserves, where there is heavy soil erosion and serious malnutrition, is a consequence of the phenomenon of urbanization, for the rural hinterlands of towns serve as labour reservoirs. Government restrictions on movement mean that wives and children are left on the reserves, in many instances to fend for themselves, while the men work in the towns. Food production, consequently, has fallen rapidly behind food needs on the Bantu reserves (Fox, 1954).

A study of an African reserve in

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northeast Transvaal (Sekhukuniland) clearly shows some of the severe social and nutritional problems. Soil is poor and rainfall is highly seasonal and sparse—averaging only 23 inches per year. Women and children form the bulk of the population because the ablebodied men have migrated to the cities. Child wastage because of malnutrition is an important problem. This study, among numerous others, illustrates the nutritional stress of the transition from tribal life to wage-economy in South Africa (Waldmann, 1960).

In one health survey of a rural Zulu community in southwest Natal, in the Polela District, it was shown that about three-quarters of the males between 25 and 40 years are absent from the community most of the time. Although from 1945 to 1955, health, education and welfare services aimed at improving the nutritional status of infants and at developing preventive measures pushed down the infant annual mortality rate from 202 to 86, the present high mortality levels caused by poverty and malnutrition cannot be reduced without economic assistance (Bennett, 1960).

Urban malnutrition

Protein-calorie malnutrition is emerging as a significant force in the rapidly growing towns of Africa as well as in rural areas. Urban diets, in fact, are often deficient in vitamins, minerals, and proteins. These deficiencies occur, in part, when important nutritional elements are lost in the processing of grains and cereals (Jelliffe, 1962, Mead, 1955). Traditional methods of preparing these plants for consumption in the countryside do not result in comparable vitiation of nutritional elements. One study of polyneuropathy (a condition strongly related to pellagra) in Dar es Salaam, Tanzania, indicates that the condition is probably of nutritional origin and could be based on the use of highly refined (and therefore niacinand thiamine-deficient) maize flour (Ebrahin and Haddock, 1964). Kwashiorkor and marasmus were found in some 2 per cent of the children in a sample in Dar es Salaam. These diseases occurred because of high starch diets and, in some cases, early weaning followed by poorly administered artificial feeding (Marealle et al., 1964).

The Acholi peoples inhabit the north central part of Uganda. In a study comparing rural Acholi with urban Acholi

the latter were found to have a higher rate of PCM, presumably because of the substitution of maize flour and other foods for traditional vegetable proteins, including millet, sesame seed and ground nuts (Jelliffe, Bennett et al., 1963). In Durban, where 1,565 cases of kwashiorkor in children admitted to clinics were studied, the peak age of prevalence was one to three years. Fifty-three per cent of the children died, and in some instances their condition was complicated by pneumonia and gastroenteritis. Excessive use of starch products was judged to be the main reason for the poor diets of these urban Africans (Scragg and Rubidge, 1960).

Several factors are implicated in urban malnutrition. One of the chief culprits is money and the high cost of protein-rich foods. The urban environment, to a much greater extent than the rural, revolves, of course, around a money economy. This factor is the core of many aspects of the malnutrition often found as a concomitant of the shift from rural to urban areas (Mead, 1955). A study done in West Africa, for example, indicates that malnutrition is more common in urban and peri-urban areas than in rural areas. It states that the value of money income in the towns is diminished by (1) obligatory expenditures such as rents, transportation expenses, and clothing; (2) by higher food prices; and (3) by having limited and even no access to home-produced foodstuffs (Hendrickse, 1966). But there are other features in a monetary economy which are detrimental to nutritional standards. One study, for example (Fendall, 1963), shows that twice as much is spent on food in the first ten days immediately after payday than in the last ten days of the month. Similarly, three times as much is spent on alcohol in the first ten days than in the last ten days.

When men work in towns and live without their families, they frequently feed themselves much less adequately than when they live in the rural areas. They lack women's expertise in food preparation and purchase. They often eat in canteens which provide monotonous and poor-quality diets. Living in towns also frequently leads to extramarital liaisons which involve a man in a new set of familial obligations under which either his village family or his city family will suffer financially (Hendrickse, 1966). Because of less effective child care in the towns, urbanization frequently results in infant malnutrition. In the towns considerable pressure is placed on young mothers to go to work. In their mother's absence, babies from two to three months old are often cared for by children from seven to ten years old. The diet for such babies is often poorly prepared canned foods. This poor diet can produce gastroenteritis and eventual malnutrition (Fendall, 1963). Kahn 1962) also reports kwashiorkor in children of working mothers.

Not only are there fewer relatives to help care for the children in towns and cities, but there is also less sunlight and therefore more rickets. In addition, there tends to be earlier weaning in the town than the country, with consequent intake of less protein. Subsistence depends mainly on expensive and poorly carried out artificial diets (Jelliffe, 1962).

Ignorant and uninformed adoption of European-type baby bottle-feeding also contributes to infant malnutrition in the practice towns. The of feeding powdered milk to babies is rapidly growing in urban areas, but this practice is being used by women with no knowledge of hygiene, no ability to read the instructions on the can, and no money with which to buy sufficient powdered milk. Thus, diluted powdered milk from dirty bottles and dirty teats is substituted for breast milk. This leads to malnutrition and dietary disorders such as marasmus, diarrhoea, or vomiting (Cook, 1966). Welbourn (1958) also comments on the uninformed use of bottle-feeding and its deleterious effects. In Uganda, bottle-fed children were two pounds lighter in average weight than breast-fed children.

It is worth looking at some specific studies of relationships between overall physical and mental development and early protein deficiency. For eleven years, Stoch and Smyth studied twenty Cape coloured infants who were grossly undernourished during infancy. The undernourished group lived under unhealthful slum conditions in one-room shanties built on sand without any sanitary facilities. Those who lived in houses were crowded into unventilated dark back rooms. Thirteen were illegitimate and, in another three cases, the fathers had deserted. Mothers appeared too apathetic to care for their children. Social workers and district nurses repeatedly requested the mothers to take their children to municipal soup kitchens or to clinics for meals but there was little cooperation. Compared to matched controls, the head circumference, height, weight, intellectual and psychological assessment and encephalograms of these children show that undernutrition during the period of active brain growth has resulted in a significant reduction in brain size and impairment of intellectual development (Stoch and Smythe, 1963, 1967).

In brief the findings are as follows (1967):

it increases to 70 per cent after one year and to 80 per cent by the age of two years. The brain increases in weight in incremental stages, but because of the metabolic stability of many of its constituents, once these constituents are laid down they may be inaccessible to the general metabolic pools of the body in times of shortage. Therefore, even good nutrition in later life cannot repair the irreversible damage done to the brain in infancy, damage which may well result in poor learning capacity in adult life (Brown, 1965, Scrimshaw,

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| | | Under- | |
|----------------|------------------|--------------------|----------------------------|
| | Control group | nourished group | Magnitude of difference |
| Average head | | | |
| Circumference | 52.04 cm | 49.58 cm | 2.46 cm smaller |
| Average height | 133.68 cm | 125.73 cm | 7.95 cm shorter |
| Average weight | 29.45 kg | 24.38 kg | 5.07 kg lighter |

In addition, electroencephalogram data indicate that twelve of the undernourished children had poorly formed low-voltage alpha waves with poor response to eye opening, whereas seventeen of the controls had well-formed high-voltage alpha waves, especially posteriorly, with an excellent response to eye opening. In terms of the New South African Intelligence Scale (not standardized for Cape coloured children), the mean for the control group was 76.70, and that for the undernourished group, 61.15—some 15.5 points lower.

Another study points to the same result-i.e., long-term crippling effects from nutritional deficiencies in early infancy, the period of maximum brain growth. From 1953 to 1964, data were collected on 1,094 autopsies performed at the Mulago Hospital at Kampala, Uganda, on children from the age of birth to fifteen years old. The children were divided into two groups: those who had suffered from malnourishment and those who had not. The malnourished children had been afflicted with kwashiorkor or marasmus. In each autopsy the child's brain was weighed. The findings for the age group four to five years indicated that the non-malnourished brain weight was 1127 grams. and the malnourished brain weight, 985 grams. The malnourished brain was 13 per cent lighter than the non-malnourished brain (Brown, 1965).

At birth the human brain is approximately 40 per cent of its adult weight; 1968). Such an assertion is supported not only by clinical experience with human beings, but also by experimental data on animals such as the pig and the rat (Barnes, 1967). A recent article covering studies of this kind notes that they

... indicate that poverty and the poor nutrition that almost invariably accompanies it may bring into the world children who are less able to learn and to earn than their genetic potential would otherwise allow.

The studies give the expression "food for thought" a new dimension. They have shown that children who receive inadequate nourishment both before and shortly after birth suffer a diminished capacity for intellectual achievement.

In fact, studies of infants and laboratory animals have indicated that children inadequately nourished while still in the womb may start life with a subnormal number of brain cells—a deficit which can never be made up. (Brody, 1968).

Thus, the concept of a close, reciprocal interrelation between aspects of organic growth and psychological capacity, influenced by both a social and an ecologic context, is a critical area for further research. Indeed, the spiralling effect, once set in motion, is difficult to break. Cravioto, after commenting on the pervasive and permanent psychobiological effects of protein malnutrition in Central America, another "underdeveloped" area, says of the "PCM spiral":

A low level of adaptive capacity, ignorance, social custom, infection, or environmental paucity of foodstuffs appears to result in malnutrition, which may produce a large pool of individuals who come to function in sub-optimal ways. Such persons are themselves more ready to be victims of ignorance and less effective than would be the case in their social adaptations. (1966, p. 320).

A concept like the PCM spiral would seem to be particularly useful in understanding many aspects of the social history of West and Equatorial Africa. Vansina (1966) discusses the rise and fall of traditional political-military empires in the Congo in terms of the spread of cassava, a very-low-protein staple. Dependence on cassava is predispositional to the development of kwashiorkor and other deficiency diseases. Such a "cassava belt" stretches along the coast of West Africa where kwashiorkor was first clinically described. And the tragic events in eastern Nigeria and Biafra are only too compelling in their underscoring of the close relationship between a proteinadequate diet and effective bodily and psychological functioning. On the latter note-that of the interpenetration of "social" or "political" events and nutritional health-one may recall the pessimistic appraisal by the African pediatrician Hendrickse, who said:

The high incidence of nutritional disorders in Africa today reflects the seriousness of the social and economic problems of the people of Africa. Current trends in African affairs offer little hope of improvement. On the contrary, the direction of social change and the long-term effects of economic policies currently in operation will inevitably result in deterioration of the present situation. Meanwhile, the unstable political situation in the continent threatens constantly to disrupt the existing economic structure and to precipitate disaster. (Hendrickse, 1966, p. 346).

Beyond the obvious clinical cases of protein deficiency in African children in the towns, there are numerous cases of *sub-clinical* protein-calorie malnutrition, sometimes known as mild-moderate malnutrition. It is difficult to diagnose. Children suffering from mild-moderate malnutrition are not suffering from visibly kwashiorkor nor are they emaciated, yet they are completely outside of the normal range of body weight for age, and they have an increased susceptibility to disease. How common this nutritional growth failure is can be judged by field surveys of pre-school children and records of young-child clinics that often show that between 15 per cent and 30 per cent of children weigh below 75 per cent of that which is normal for their age, and therefore fall into this mild-moderate malnutrition group (Cook, 1966).

Thus, it would appear that the major benefit of urbanization for child nutrition is the provision of clinics and other health facilities in which mothers can eventually be educated and severe cases of malnutrition can be treated. But thus far the overwhelming impact of the urban environment on child and adult nutrition has been negative.

In conclusion, we firmly assert that programmes of economic or agricultural development, population relocation, industrial construction, or any programme which either deliberately or inadvertently changes pre-existing relationships between man and any aspect of his environment must be viewed from the outset in an ecologic framework. We must realize the serious hidden costs of a new "ecologic contract" between man and his surroundings. Perhaps it would be useful for public health specialists to start talking about a new category of diseases analogous to the "iatrogenic" diseases known in medicine. Such diseases could be called the "diseases of development" and would consist of those pathological conditions which are based on the usually unanticipated consequences of the implementation of developmental schemes.

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THE ECOLOGIST IS MOVING

The offices of the Ecologist are moving to Cornwall. From the 1st December all correspondence to the editorial, production and subscription departments as well as general enquiries should be addressed to The Ecologist, "Catesby", Molesworth Street, Wadebridge, Cornwall. Display and classified advertising will continue to be received at 73 Kew Green, Richmond, Surrey.

Modern medicine is dominated by the high technology approach. This is extremely expensive and not particularly successful. Why then do we persist with it, and what alternatives are there?

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"(The physician who is an honour to his profession is one) who has a due regard to the seasons of the year, and the diseases which they produce; to the states of the wind peculiar to each country and the qualities of its waters; who marks carefully the localities of towns, and of the surrounding country, whether they are low or high, hot or cold, wet or dry; who moreover takes notes of the diet and regimen of the inhabitants, and, in a word, of all the causes that may produce disorder in the animal economy".

Airs, Waters and Places Hippocrates.¹

Diminishing returns

It seems unnecessary to demonstrate

the optimism that underlies industrial man's confrontation with disease. News stories of fresh battles won are frequently relayed through the mass media to a public that has grown to expect such victories. More frequent still are stories of new and more powerful weapons that will ensure future conquests. While most are aware that cancer and heart disease remain to be subdued, there are few who doubt the ultimate outcome. It did not seem unreasonable to the American public for President Nixon to project the imminent conquest of cancer.

Nor is it necessary to document in detail the rapid pace of medical inflation-especially in the last two decades. Three examples will suffice. In England and Wales the number of hospital workers increased by seventy per cent over the two decades to 1969.2 By comparison, the increase in the total workforce was only ten per cent.3 In the Soviet Union in the period 1940 to 1968 the number of physicians in relation to population increased more than threefold and the number of days spent in hospital in relation to population increased more than two and a half times.4 In the United States per capita health expenditure rose from \$79 to

\$324 in the two decades to 1969–70;⁵ an increase of 310 per cent over a period in which the consumer price index only rose by around 60 per cent.⁶

What has been the result of these redoubled efforts? Would they provide grounds for optimism to a purely rational man? Figure 1 shows the trends in the major mortality indices in England and Wales for the 100 years up to 1970. It may be noted that it is precisely during the last two decades when scientific medicine is alleged to have blossomed and when the quantity of resources allocated to medical care has been rapidly increased—that the decline in mortality that has been associated with industrialization has tapered off to virtual zero.

Whilst it is true that female life expectancy is continuing to increase marginally, the picture for men is very sobering. Although more are surviving the infectious diseases of childhood than was the case three decades ago, their prospects once they have reached adulthood are hardly any better. The gap between male and female life expectancies has widened with marked social consequences. This can be shown by trends in the mean "period of widowhood" (figures for England and Wales.^{7 8}

| | 1930-32 | 1948-50 | 1966-68 |
|--|-----------|-----------|-----------|
| Mean difference in age at marriage Mean difference in life | 2.58 | 3.39 | 2.63 |
| expectancy at age of marriage (say 25) | 3.01 | 4.10 | 5.62 |
| Mean period of widowhood | 5.99 yrs. | 7.49 yrs. | 8.25 yrs. |

Thus even the meagre gains in female life expectancy are only serving to increase the number of lonely old women in industrial societies. There is no worthwhile gain for either women or men.

The major technical failure of modern medicine has been its inability to reduce premature death in men. In the United States, death rates for men in the age range 45-75 actually tended to increase in the period 1954-1963.9 In England and Wales, the age-specific death rates for unskilled workers over the age of 50 were probably higher in 1959-63 than they had been in the depression years 1930-32.10 Nearly twice as many men as women currently die in middle age and ninety per cent of this excess mortality in men can be attributed to heart disease, lung cancer and bronchitis.*11

Some will object that there is more to life than the avoidance of death. Death statistics are, however, the most reliable figures that are comparable over time. In England and Wales the best information on trends in illness (as distinct from death) are returns for the employed male population on sickness absence from work. Morris has reviewed these from the nineteen-twenties to the early nineteen-sixties and concludes that "sick absence rates in men show no improvement".12 He made a more detailed examination of trends in the nineteen-fifties which showed "an appreciable rise of chronic sickness among men in their late fifties, and a very substantial one, amounting to 30 per cent, in men in their early sixties".13 More recent figures for the period 1962-3 to 1968-9 show an overall increase in absence attributed to cardiovascular diseases, respiratory diseases (other than bronchitis and tuberculosis), diseases of the musculo-skeletal system

* Although the rich complain of their allegedly greater vulnerability to heart attack, the difference in mortality rates between the rich and the poor was almost certainly wider in 1959–63 than it had been in 1930–32—see.¹⁰ and "accidents, poisoning, and violence".¹⁴ Thus, such information as is available on trends in sickness in men carries no more optimistic a message than for deaths.

Two final qualifications to this critical review of the recent gains from medical technology need to be made. Firstly, such technology exists not only to prevent and cure illness but also to help sick people cope with their illness. There have been many valuable gains in symptom relief—the anti-allergy, asthma relieving and pain-killing drugs are obvious examples. Secondly, given the close relationship in the long term between the regulation of numbers, nutritional standards and health (see below), oral contraceptives, intraprovement of health that has occurred in the last two centuries?; secondly, what is the nature of the residual task that contemporary medicine faces?: and, thirdly, is the current medical effort technically appropriate to its task?

Reasons for the improvement in health

Thomas McKeown has assessed the factors responsible for the decline in the death rate in England and Wales since it began in the second half of the eighteenth century.¹⁵ Most of this decline has been in deaths from infectious diseases in early life.

The first major factor was improved nutrition-acting from about 1770.

Figure 1. Trends in the major mortality indices over the last century—showing the recent onset og a situation of diminishing returns

(Sources: Male and female life expectancies (averaged) from Registrar-General's Statistical returns for England and Wales, various years. NHS expenditure from Annual Reports, Ministry of Health/Department of Health and Social Security. Expenditure standardised using the "services" price index from the Statistical Office.)

uterine devices and improved abortion techniques are significant gains.

But the overall outcome of industrial man's recent contest with disease is hardly the success story it is so widely believed to be. Why is this so? To help answer this, three questions will be briefly examined: Firstly, what are the main lessons to be learnt from the im-

It is precisely during the last two decades—when scientific medicine is alleged to have blossomed and when the quantity of resources allocated to medical care has been rapidly increased—that the decline in mortality that has been associated with industrialisation has tapered off to virtual zero. During this period, when the death rate first began to decline, agricultural productivity was increasing significantly. It is unlikely that the growth of the new industrial towns led to an improvement in the immediate human environment. None of the drugs and techniques then available to medicine-with the possible exception of inoculation against smallpox-can be regarded as likely to have affected the natural history of diseases within the population. Improved nutrition is known to have played a leading part in the decline in deaths from tuberculosis-and the decline in deaths from this cause represented 47 per cent of the total decline in the death rate between 1851–1900. Improved nutrition is, in McKeown's view, the factor most likely to have been operating to reduce deaths since that reduction first began.

Figure 2. Deaths of Children under 15 years attributed to scarlet fever, diphtheria, whooping cough and measles (England and Wales)

(Source: Porter, R. B. "The Contribution of the Biological and Medical Sciences to Human Welfare", *Presidential Addresses of the British Association for the Advancement of Science, Swansea Meeting*, 1971, Published by the British Association. Figure 3.)

Ultimately nutritional standards depened on food supply relative to numbers:

"If the birth rate in England and Wales had remained at the level of 1870, the population today would be 140 million instead of 46 million, with effects on the standard of living and health that can be imagined ... Although the improvement in health was initiated by increased food supplies, without limitation of numbers the advance would soon have been eliminated. Viewed historically, balance between food and the population size on which health depends owes less to increase of food than to control of numbers."16

Thus, in a later essay, McKeown rates the change in social behaviour that led to the voluntary and effective control of births (in England from around 1880) as the factor which has contributed most to current standards of health.

The second major factor was sanitary reform. This was followed by a reduction in deaths from enteric infections from about 1870.

The third major factor has been medical interventions in individuals. It is unlikely that this made a very significant contribution before the second quarter of this century and it is very difficult to make an estimate of its relative contribution since then.

It is widely believed that the introduction of antibiotics and effective immunization campaigns marked a dramatic breakthrough in the fight against infectious diseases. Whilst this

may have been true in particular cases -for example, immunization against diphtheria-their contribution to the total decline in mortality over the last two centuries has been a minor one. Most of the reduction in mortality had already occurred before they were introduced and there was only a slight downward inflection in an otherwise declining curve following their introduction. Porter has recently plotted, for England and Wales, deaths in children under 15 years attributed to scarlet fever. diphtheria, whooping cough and measles in the period 1860 to 1965.17 Nearly 90 per cent of the total decline in the death rate over this period had occurred before the introduction of antibiotics and compulsory immunization against diphtheria (see Figure 2).

Two related lessons can be learnt from the decline in deaths from infectious diseases during industrialization:*

Firstly, the major importance for health of man's interaction with his environment—both in his appropriation of external nature (in the provision of food and in sanitary control) and in his voluntary regulation of births. These interactions can be summarized as man's ecology.

Secondly, the minor importance for health of medical interventions in the individual.

The contemporary medical task

Most of the significant diseases of industrial societies can be grouped under three heads:

- 1. Congenital disorders.
- 2. Mental disorders.
- Diseases which are usually more common in, or exclusive to, industrial populations, including for example:
 - arteriosclerosis (heart attacks and strokes).¹⁹
 - diabetes.20 21
 - hypertension.²² 23 24 25 26 27
 - some forms of cancer (especially lung, large bowel and breast.^{28 29}
 - chronic bronchitis.
 - dental caries.21
 - duodenal ulcer.^{30 31}
 - appendicitis and diverticulitis.^{32 33}
 - varicose veins.34
 - specific occupational disorders,
 - road traffic, industrial and domestic accidents.

The residual fourth group of diseases unrelated to our way of life is unlikely to be large. It will include some of the infections (for example, those caused by saprophytic streptococci and staphylococci), some of the cancers,* a small proportion of "degenerative" illness (if universal ageing processes are excluded) and perhaps a larger proportion of metabolic disorders.

The third group constitutes a large proportion of the total burden of disease in industrial communities and seems in many respects to be the most potentially tractable.[†] If the traumatic and specific occupational diseases are excluded, how are the remainder most appropriately characterized?

They are often referred to as "chronic" and contrasted to the "acute" diseases of earlier periods. But heart disease may be no less acute in its impact than the tuberculosis or de-

[†] The problems raised by mental disorders are not discussed further in this paper. In general, I feel that inasmuch as they are behavioural and environmental in origin, they pose problems of a similar kind to group three. Inasmuch as they have another cause (and this probably applies to most cases of schizophrenia), I consider that they are likely to prove relatively intractable.

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^{*} It should not be presumed that industrialization made it possible, for the first time, for man to be free of the burden of all Many communicable of these diseases. diseases could only have come into existence after the neolithic revolution had created population groupings sufficient to sustain them.18 They thus represent the first group of diseases to have followed a transformation by man of his relationship with nature.

^{*} It has been estimated that around 80 per cent of all cancer has its aetiology in man's relation to his environment.³⁵ It must be acknowledged, however, that some forms of cancer have been decreasing in incidence as level of material affluence has increased stomach and cervical cancer are examples.

ficiency diseases of earlier periods. And labelling a disease as "chronic" does not tell us much about it. The distinction between infective and degenerative diseases is more useful. It reflects the true situation-that infectious diseases have largely been supplanted as major health problems-and tells us something about the nature of the disease processes. But a further question immediately arises: Is the degeneration involved a universal feature of the biology of man which is simply more visible where a large proportion of the population survives to old age or is it principally or exclusively the result of a particular set of ecological relationships? In the diseases quoted available evidence supports the latter alternative.

There have been two major transformations in man's relationship to external nature:

- 1. When hunter-gatherers became farmers (the neolithic revolution).
- 2. When farmers became industrial city dwellers (the industrial revolution).

Thus, there have been three successive human ecologies—that of hunter-

There is no convincing evidence that hospital treatment increases the chance of survival following a heart attack. gatherer man, that of agricultural man and that of industrial man. Although it is as a hunter-gatherer that man has spent at least 99 per cent of his time on earth, there is little reliable information on the disease patterns of huntergatherer man. Existing hunter-gatherer cultures are isolated survivals in harsh environments and may differ significantly from pre-neolithic huntergatherers who lived under more favourable conditions. It is possible, however, to make some comparisons in the incidence of degenerative diseases in the following three groups:

- Early agricultural communities, for example rural Africans and New Guineans.
- (ii) Late agricultural communities, for example much of the English population in the eighteenth and nineteenth centuries and traditional rural communities in Europe.
- (iii) Advanced industrial communities.

Available evidence suggests a general trend for the degenerative diseases listed to either increase in incidence from (i) to (iii) or to be almost exclusively limited to (iii).³⁷ This trend may, of course, be due to the different genetic characteristics of the populations living in these different environments. It is often possible, however, to compare people of the same race living in different environments (for example rural Africans and US Negroes) and such comparisons do nothing* to weaken the general trend. For some of the degenerative diseases, the causes are well known-as in the case of tobacco smoking and lung cancer and refined diet and dental caries. Because arteriosclerosis (manifest principally as ischaemic heart disease) has rapidly increased in prevalence to become the commonest cause of death in most advanced industrial countries, its epidemiology has attracted much attention. The general picture is now quite clear: it is very common in North America and in much of Europe, less common in Southern Europe and Japan and very uncommon among rural Africans and New Guineans.¹⁹ Diet is thought to play a significant role. A similar gradient in incidence has also been recently noted for large bowel cancer.29 This is, in many industrial countries, second after lung cancer as a cause of cancer death in men. Whereas the incidence in US Negroes is comparable to that in US Whites, it is ten times higher than for rural Africans. Diet seems a likely principal cause.

Although the epidemiological evidence is scanty for many of these degenerative illnesses, the general trend is unmistakable—there is an "ecological gradient" with an increasing incidence as man's way of life becomes further

* A general picture is, however, attempted in.³⁷

removed from that of his huntergatherer forbears. It is as a huntergatherer that man (and his ancestors) evolved and, therefore, to that way of dife that he is genetically adapted. In the last million years of human history, there are likely to have been around 50,000 generations. Only 300 to 400 of these have occurred since the neolithic revolution first began within one part of the human population. It is unlikely that there has been any substantial genetic adaptation in this period.³⁸

It should now be clear that it is insufficient to describe these diseases as degenerative. They are more appropriately referred to as diseases of maladaptation—for whatever their individual causes, they may be considered as resulting from the fact that man's relation to his environment has become removed from that to which he is biologically adapted. Boyden has ironically referred to modern medicine as "cultural adaptation, to biological maladjustment".³⁹

The current medical effort

If it may be claimed that heart disease is a typical disease of industrial man, it may also be claimed that the response to it typifies a general trend towards a high medical technology. There has been little development of the theoretical and practical tools for an effective preventive approach. The major thrust has been towards the hospital treatment of heart attack-especially by the use of very expensive intensive cardiac care units. In the USA it is estimated that 3,000 such units were established by the end of 1971 and that they were using up ten per cent of that country's trained nurses.40 There is no convincing evidence that hospital treatment increases the chance of survival following a heart attack. The only randomized controlled trial which has compared treatment at home with hospital treatment, with which this author is familiar, failed to show any benefit from hospital treatment. It was based on 1,200 episodes of heart attack in men under 70 in the South-West of England.41 Even if there were shown to be some marginal gains it is doubtful whether such expensive interventions in those already smitten with an acute episode could ever constitute a satisfactory response to a disease process which is progressive over time and not restricted to one location within the body. (It may be contrasted in these respects with

Available evidence suggests the major importance for human health of a favourable relationship between man and his environment. Despite this, the ecology of industrial man has not become a major concern of medicine. On the contrary, a rapidly increasing medical effort is being concentrated on a front which has hitherto seen only limited successes-that is on physical and chemical intervention in sick individuals.

another disease of maladaptation appendicitis—where specific surgical intervention is mercifully appropriate and effective.

Much of the recent increase in resource consumption for medical care has been for short-term hospital care and drugs. In England and Wales for the two decades to 1969–70 total expenditure on the National Health Service increased by around 320 per cent (at current prices) whereas expenditure on hospitals increased by 395 per cent and on drugs (outside of hospitals) by 477 per cent.⁴²

Thomas McKeown has noted the extent to which the contemporary medical effort is based on an "engineering" approach to the improvement of health:

"The approach to biology and medicine established during the seventeenth century was an engineering one based on a physical model. Nature was conceived in mechanistic terms, which lead in biology to the idea that a living organism could be regarded as a machine which might be taken apart and re-assembled if its structure and function were fully understood. In medicine, the same concepts lead further to the belief that an understanding of disease processes and of the body's response to them would make it possible to intertherapeutically, mainly by vene physical (surgical), chemical, OL electrical methods."43

In view of the limited effectiveness of this approach, it is worth examining its origins. At least three factors have been important. Firstly, given the traditional form of doctor-patient interaction, it was inevitable that doctors would strive to get better and better at intervening in their patients' illnesses. This is the historical foundation of the engineering approach. When doctors drew from the emerging biological science of the nineteenth century, they chose that strand which had the most obvious relevance to their ability to treat their patients: They chose what Crombie refers to as the "Science of the organized individual" and were singularly uninfluenced by the other strand-"the science of populations". This theoretical bias is the second important factor. Crombie's comment (which obviously inspired that of Mc-Keown above) is as follows:

"The biology of the individual is more like engineering than physics, in that each type of living organism is a solution to a specific set of engineering problems—problems of intake and conversion of fuel, locomotion, communication, replication and so on which it has to solve to survive. This subject matter has imposed on Physiology its characteristic programme: to find out how an organism works by taking it to pieces and trying to put it together again from knowledge of the parts."⁴⁴

In medicine, as McKeown has noted, this theoretical foundation lent support to the view that it was the doctor's role to intervene chemically (by drugs) or physically (by surgery) in order to restore the patient's(s') disordered system or systems to normal.

The extent to which population biology - particularly evolutionary theory and ecology-have failed to influence medical theory is guite remarkable. This has led to serious weaknesses in much contemporary medical thinking. For example, in the absence of any evolutionary perspective on our current way of life, a biologically abnormal relationship to the environment is often implicitly accepted as normal. Thus progressive arterial degeneration, rising blood pressure and a tendency towards diabetes with increasing age are accepted as features of normal populations even though they clearly predispose to the onset of overt disease. There is endless debate as to what constitutes normal limits for blood pressuresfondly referred to in England as the debate between the "Plattites", who follow Lord Platt in believing that high blood pressure is indeed high, and the "Pickeringites", who follow Sir George Pickering's belief that it isn't high if it's

High rates of medical activity produce high rates of doctorcaused illness—for example drug reactions. High rates of prescriptions contribute to an increasing dependence on drugs throughout society.

normal to be high.⁴⁵ It hardly needs to be added that the debate gains its significance not from a felt need to prevent the development of the abnormal but from the felt imperative to knock it into line with drugs.

Frequently, naïve interpretations are placed on the relative contributions of nature and nurture to disease processes. Epidemiological studies, say on ischaemic heart disease, are carried out in populations with an industrial way of life (again implicitly assumed to be normal); on the basis of the findings a certain weight is accorded to the influence of heredity on the disease. The fact that these inherited characteristics may only become relevant to the aetiology of the condition under new and biologically abnormal stresses-and that it is therefore the interaction between the stresses and the inherited variation in body build that is important-is often not acknowledged.46 This fallacy has been nicely exposed by Cleave and Campbell: in populations that wear shoes the inherited variability of the build of the foot may well make some individuals more likely than others to develop bunions-but bunions only occur in populations who wear shoes.47

The third group of historical influences on the rise of the engineering approach are professional and institutional ones. Rosenberg has recorded how the American medical profession in the middle of the last century, hitched its fortune to the rising star of science.48 The germ theory of disease came just in time to save the faltering public prestige of doctors. But the reasons why the medical profession was so resistant to the implications of evolutionary theory remain to be explored-was it the religious conservatism of the medical establishment or a sheer lack of imagination-or something else? Class interest was also important in suppressing an alternative approach. While the well-to-do physicians proffered their clinical skills to the rich, it was social and preventive medicine that was needed most urgently for the poor. Unfortunately, the prestigious physicians

dominated the teaching hospitals and medical education and, therefore, the theoretical and practical development of public health and preventive medicine received little encouragement.

This rapid review of the technical side of modern medicine may now be summarized: Available evidence suggests the major importance for human health of a favourable relationship between man and his environment. Despite this, the ecology of industrial man has not become a major concern of medicine. On the contrary, a rapidly increasing medical effort is being concentrated on a front which has hitherto seen only limited successes-that is on physical and chemical intervention in sick individuals. Some of the historical reasons why medicine has chosen this path are relatively clear. However, the trend is gaining rather than losing momentum as more sophisticated and expensive medical engineering technologies are continuously being developed and deployed. If this is not the most effective and rational way to improve health, why are these developments following an upwardly curving trajectory? In order to suggest an answer to this, it will be necessary to look at the other-"cultural"-side of medicine.

The human side of medicine

There must be few contemporary cultures that have escaped the attentions of anthropologists and yet these investigators usually find it possible to identify medical institutions and medical culture within the wider cultures they are studying. Medical institutions can be identified by their purpose-they mediate between man and his vulnerability to disease. It is clear that medical cultures differ from one another as radically as do the wider cultures of which they are a part. Further, differing medical cultures have a certain internal consistency-that is, the way in which any individual copes with disease is to a large extent socially determined.

Magical medicine would be widely regarded as the most primitive element of medical culture. But how is magic to be interpreted? Western rationalism has placed great emphasis on the importance within man's mental life, of gaining as accurate as possible a picture of reality. Within this approach it is the content of a belief rather than its social function which is considered important. Thus magic involves a set of very stupid There is considerable evidence to suggest that improvements in the effectiveness of engineering medical technology are, when taken over all, only just managing to neutralise the increasing impact of diseases of maladaptation.

beliefs ("superstitions") from which there is nothing to learn. An alternative and more fruitful approach is to focus on the social function of magical beliefs and practices. Levi-Strauss has shown that this is, in fact, what the practitioners of magic do.49 If the members of such a community are presented with evidence which is inconsistent with their magical beliefs, they do not deny the evidence-but nor does the evidence weaken their faith in magic. Faith in magic then, is not critically dependent upon the status of magical beliefs as accurate representations of reality. In the same paper, first published in 1949, Levi-Strauss comments on a published biography of an Eskimo shaman. This shaman had started out as a rationalist sceptic within his Eskimo community. He decided to get close to the shamans, to learn the tricks of their trade and then to expose them as hoaxers. He found that the shamans were not without insight into the nature of their art but genuinely believed, as it were, that it was good for their patients. Both the shaman and his patient had an interest in the efficacy of magic-and, indeed, that magic was often efficacious. Finally, the subject of the Biography becomes a practising shaman himself. This does not prevent him from retaining a measure of concealed scepticism to the end of his professional career.

In this materialist* perspective, the significance of magical medicine is seen to lie not in the logical content of the beliefs, but in the way in which the beliefs and activities serve to neutralize and reduce perceived threats and actual misfortunes. Communities that are con-

* I can think of no better label for this approach, in which the understanding of the relation between ideas and social practice is seen as the key to the understanding of human society. Some may prefer to call it "interactionism" in view of the other contemporary meanings of "materialism". I have been inspired by Marx's attack on G man idealism,⁵⁰ and by his view that the history of man is, at its most fundamental, the history of man's "metabolism" with nature.⁵¹ Levi-Strauss's anthropology is also materialist in the above sense.^{52,53} It should be clear that I have no wish to underemphasize the spiritual and moral capabilities of man.

stantly exposed to natural forces that are apparently beyond man's control need many means of coping with their vulnerability. Magic is an active response to that need.

Religion and medicine were closely associated in Europe until relatively recent times. In the medieval period, it was the religious orders that maintained the hospitals and infirmaries and this association has continued in some institutions to the present day. Religious interpretations were placed upon illness and relief from suffering was sought in the healing rites of the church. The central theme in the theistic response to man's vulnerability to disease and suffering is resignation to the will of God. Belief in an after-life helps the sufferer to make little of the cruelties of this earthly realm. It is worth noting that there was also a fatalistic character to non-religious interpretations of illness during the medieval period. The movement of the heavenly bodies was widely believed to be responsible for epidemics and for individual episodes of illness. If the social reinforcement of resignation to misfortune is the functional core of religious medicine, then this core can be seen to be common also to nontheistic mysticism such as Buddhism and even to Stoicism.

No account of medical culture would

be complete unless it acknowledged man's capacity for compassion. There must be few who are not frequently distressed by the suffering of a fellow creature and it seems unnecessary, if not offensive, to seek functional justifications for the behaviour that this sentiment inspires. But compassion does have some wider implications. It strengthens the sufferer and enables him to objectify his suffering—as in: "It was so bad I had to call in the doctor". It also helps to preserve social cohesion in times of misfortune.

Unfortunately, there is another side to the emotive response to the sick: They may be perceived as an unwanted reminder of the vulnerability of the well to diseases that they dread, and so evoke apprehension and disquiet. This applies particularly to those whose behaviour is bizarre and unpredictable (the insane) and to those who are physically deformed or mentally handicapped. In these instances, social mediation may well work against the interests of the sick individual-as for example, when they are incarcerated in the longstay hospitals to relieve others of the disquiet that their presence creates.*

So far, four modes of mediation be-

* Much of the American literature in this field concentrates on the process of incarcerating the insane rather than on why the sane reject the insane. See for example.⁵⁴

tween man and his vulnerability to disease have been identified-magic, religion, compassion and rejection. By none of these means is the natural history of disease processes within individuals predictably and specifically changed for the better. That has been the achievement of the fifth mode-effective technical intervention to combat disease. All medical cultures can be regarded as being principally made up of these five elements.* Up until the last quarter century, all medical cultures were in practice largely compounded of the first four modes of mediation. Such cultures helped man to cope with vulnerability to disease but did little to reduce that vulnerability. Such technology as existed, provided the means for doing something for the patient but only rarely would that something have achieved any specifically induced change for the better. None of this is to deny that there was a progressive increase over the past several centuries in the understanding of the body and of disease processes within it. But, until recently, the main practical consequence of this development was that it provided doctors with a more impressive vocabulary, with more convincing

* I have derived this analytic model from that used by Mark Field.⁵⁵ To his four types of "societal response" I have added "rejection". In the UK the cost of the hospital treatment of ischaemic heart disease has been estimated at £21.9 million for 1969. Some of this expenditure would almost certainly have secured much greater reductions in mortality from heart disease if it had been deployed on prevention rather than cure—for example on health propaganda directed at overweight, smoking, middleaged males.

rituals-and served to legitimise their elite status.*

In recent decades, and especially since World War II, scientific medical technology of an engineering kind has gained overwhelming dominance in the mediation between industrial man and disease. If someone is struck down by a heart attack he is rushed to a special intensive cardiac care unit. If someone is mutilated in a car accident, there is the prompt wail of the ambulance, the sure swift movement of the ambulance man and rapid transfer to an accident and emergency unit. If someone is discovered to have cancer, he "has to go to hospital" for an operation. If someone is sad and depressed he will be given drugs-and, if unremitting, perhaps electro-convulsive therapy. All the major crises are catered for in a surehanded scientific manner-and the minor ones too. There has been a massive increase in the prescription of psycho-active drugs. Large quantities of antibiotics are prescribed for upper respiratory infection.†

Medical education—despite concessions to psychiatry and social medicine —is gearing medical students up to higher and higher levels of technical performance. Medicine is seen by students to be about technical interven-

† In Australia for the year 1966 there were seven prescriptions of antibiotics for every ten persons.⁵⁷ tions in sick people—the more sophisticated the technology the more sophisticated the medicine. With such assumptions, ascendant young doctors are reluctant to leave the hospitals which are clearly "where it's at". General practice, and with it a broader conception of the role of the doctor, languishes.

Consumers have been willing to pay a high and rising price for this style of medicine. As well as the rapid increase in resource demands referred to earlier, there are indirect costs. The achievement of technical excellence is considered to require the centralisation of medical facilities. Small hospitals are closed and access becomes more difficult. High rates of medical activity produce high rates of doctor-caused illness —for example drug reactions. High rates of prescription contribute to an increasing dependence on drugs throughout society.

So the original paradox is presented again in sharper form. Industrial man throws his energies into the technical mastery of nature by working on numerous independent fronts. In medicine, he has interposed a complex technology between himself and disease. This technology is mostly of an engineering character-that is it is designed to repair disordered systems within sick individuals. The evidence suggests that he owes his standard of health, not so much to the achievements of this technology as to the favourable nature of his new relationship with his environment with respect to his vulnerability to infections. Unfortunately, this new set of environmental relationships are unfavourable with respect to another cluster of diseases-diseases of malconadaptation. Further, there is siderable evidence to suggest that improvements in the effectiveness of engineering medical technology are, when taken over all, only just managing to neutralise the increasing impact of diseases of maladaptation.

Despite the availability of considerable evidence on these issues, little attention is paid to it. Instead, it is widely believed by both doctors and patients that industrial populations owe their higher health standards to "scientific medicine", that such medical technology as currently exists is largely effective in coping with the tasks it faces and that it offers great promise for the future. There is a general willingness to meet the increasing economic and Nearly all doctors, if questioned at a scientific meeting, would admit that antibiotics are ineffective in altering the course of viral infections and that they should not be used indiscriminately. Yet the prescription of antibiotics is now widely expected by patients when they present to their doctor with an upper respiratory infection and most doctors oblige.

social costs of this style of medicine.*

How is this paradox to be understood? By focusing on the nature of the inter-action between the sick and the purveyors of high technology medicine, it may be possible to differentiate the "helping to cope"† and "effectively combating disease" elements of modern medical culture. Two typical forms of modern medical inter-action will be taken as examples—the hospital treatment of heart attack and the treatment of upper respiratory infections with antibiotics.

The possibility of a heart attack is one of the spectres that haunts middleaged men of the industrial world. Increasingly elaborate technologies are being developed to cope with this threat and these find their highest expression in intensive cardiac care units. When an individual is struck down with a heart attack, an impressive array of complex technology-perhaps even extending to a "cardiac ambulance"-can be rapidly brought into operation. Thanks to television, the ensuing battle with death is part of public experience-the faltering heart rhythm traced on the oscilloscope screen, the mysterious fluid funnelled into the veins, the white-coated doctors fussing around the passive victim. It all seems very impressive and credible. Middle-aged men are reassured by the knowledge that their hospital has an intensive cardiac care unit. But, as noted above, there is no convincing evidence that this energetic intervention secures any more favourable an outcome than simple treatment at home. What then is going on?

beginning. † The first four modes of mediation listed earlier.

^{*} Within the tradition of Western philosophical idealism, the evolution amongst the medical elite of ideas about the nature of disease processes and about treatment has been regarded as the very stuff of medical history. Idealism of this kind was attacked by Marx and Engels: "In direct contrast to German philosophy, which descends from heaven to earth, here we ascend from earth to heaven...we do not set out from what men say, imagine, conceive...we set out from real, active men and on the basis of their real life process, we demonstrate the development of the ideological reflexes and echoes of this life process, but consciousness by life."⁵⁶

^{*} This is not to deny the increasing controversy about medicine—especially in the USA. But most of the dissent so far has been directed against the existing pattern of organization and financing of medical care. Fundamental questioning of the bases of contemporary medical culture is only just beginning.

The scientific rationale for these cardiac units is as follows. When a coronary artery becomes blocked, and a part of the heart muscle dies, there is a risk of death from two main causes. The heart may be left too weak to adequately pump the blood or, the electrical impulses which regulate the rhythm of the heart may become disturbed and cause the heart to stop beating. It is the latter possibility that intensive cardiac care is designed to prevent. By monitoring the heart rhythm electronically, it is thought possible to get an early warning of imminent disruptions. Chemical, electrical or physical interventions may then be rapidly instituted in order to stabilise the heart rhythm again. It is on these engineering type interventions that scientific attention has been focused. The specialists claim to be able, in some cases, to reverse these dangerous disturbances in rhythm. It is unnecessary to doubt the validity of this claim. But everyone is aware that the heart is easily excited by emotion. Is it not likely, therefore, that by rushing the victim into an environment that is so abnormal (even for industrial man); by placing him with others who are dying from the same condition, and by fussing around him and connecting him up to machines and intravenous drips; that, by doing all these things, the "treatment" might be frightening as many disturbances into the heart rhythm as the drugs and electrical shocks are able to get out? This may be why it has been difficult to show any over all objective gain.

What is notable is the preoccupation with an engineering style of response and the reluctance to compare outcome with that from a low technology (home treatment) response. The scientific testing of this high technology response was widely regarded as unethical until the publication in August 1971 of the study (already referred to) by Mathers et al. which failed to show any benefit from it. Despite this, specialists have been willing to encourage massive expenditure on intensive cardiac care-on a scale in the United States that has been referred to above. In the UK the cost of the hospital treatment of ischaemic heart disease has been estimated at £21.9 million for 1969.58 Some of this expenditure would almost certainly have secured much greater reductions in mortality from heart disease if it had been deployed on prevention rather than cure-for example on health propaganda directed at overweight, smoking middle-aged males.*

* Such propaganda is frequently thought to be ineffective. However, tobacco sales fell $4\frac{1}{2}$ per cent in 1971⁵⁹ following the publication, at the end of 1970, of the Royal College of Physicians report *Smoking and Health Now*. It may be estimated that this reduction, if sustained, would prevent at least 4,000 excess deaths—a large proportion of them

The development of intensive cardiac care cannot be explained as a rational programme to reduce the toll from ischaemic heart disease. It has a momentum which is almost detached from considerations as rational as this. How different, functionally, are the activities involved from the rituals of the magicians of old? Both are active responses to forces threatening wellbeing. In neither case is there much enthusiasm amongst the operators for testing the over all effectiveness of their treatment and, in any case, such considerations do not seem central to the worthwhileness of the activity. The operators work in ways that are credible within their wider cultures. Their activities provide means of coping with some threat which, if not coped with, would leave its victims exposed and, more importantly, would remind the other members of that society that they. too, were defenceless before the same threat. With the progress of industrialisation, the strength of theism has waned. Alone and mortal in an indifferent universe, industrial man seeks to screen off the void that surrounds him. He does not find it easy to face mis-

from heart disease.^{60 61} But a concerted effort to reduce tobacco consumption is yet to be taken. The Health Education Council spent £120,000 on its smoking and health campaign in 1970/71.⁶² By contrast, the cost of sickness absence from work attributed to ischaemic heart disease in 1969 has been estimated at £88 million.⁶³ The currently dominant engineering approach to the improvement of health is not only too expensive (even for America) but is largely ineffective. It is also self-defeating.

fortune with a dignified resignation so that, when it does strike, "something must be done". Questions should not be pressed on the effectiveness of available technology.

It is not only the grave threats to life that evoke this response, but also the minor irritants. One of the recurrent annoyances of urban life are upper respiratory infections which frequently leave the patient feeling miserable. The patient, therefore, expects his doctor to do something. Now most of these infections are viral and nearly all doctors, if questioned at a scientific meeting, would admit that antibiotics are ineffective in altering the course of viral infections and that they should not be used indiscriminately. Yet the prescription of antibiotics is now widely expected by patients when they prethemselves to their doctor sent with an upper respiratory infection -and most doctors oblige. This author was once called to task by a general practitioner for whom he was deputising for failing to prescribe antibiotics to a woman with the classical signs and symptoms of a viral upper respiratory infection. The woman was feeling very miserable and her general practitioner felt that she "deserved" antibiotics. Whilst few general practitioners would offer such a blatantly non-scientific justification for prescribing antibiotics, most are more convinced, as it were, of the human value of this type of exchange between doctor and patient than they are of its effectiveness in altering the natural course of events. But they would prefer not to be pressed on this latter issue. This complex, subtle and apparently contradictory working philosophy is similar to that of the Eskimo shaman referred to by Levi-Strauss. Such an attitude is annoying to rationalists who believe that it is wrong to adopt attitudes which are not logically consistent. This behaviour is, however, quite consistent with the materialist view that man seeks first of all to cope with the real world of experience.

I have argued above that some activities which are commonly graced with the name of "placebo" treatment are functionally equivalent to magic. In the field of symptomatic treatment, it is often very difficult to differentiate the following three types of response to medical interventions. Firstly, there are the predictable and specific physiological responses. The response to an anti-inflammatory drug such as aspirin in a muscular sprain is a good example. Secondly, there are non-specific but nonetheless physiological responses that could not be predicted from the known properties of the drug. This is frequently referred to as a psychosomatic or placebo effect and may be observed, for example, in the effect of dummy tablets in lowering blood pressure or relieving tension and anxiety. The third type of response involves no objective change and yet both doctor and patient are convinced that the treatment is helpful. Examples here are psychotherapy and antibiotics for viral upper respiratory infections (although in this latter case there may also be a response of the second kind).

There is no good reason why "magic" should be limited to interventions that produce this third type of response. There is abundant evidence that magicians in pre-industrial cultures are well able to induce physiological responses.* It is the ability to secure highly predictable and specific beneficial effects from medical interventions that is new. That has been the achievement of scientific medicine. Modes of active intervention that existed before may fairly be characterized as magic. Whilst a rose by any other name (placebo, psycho-somatic treatment) would smell as sweet, it is as well to be reminded of its ancestry.

While ever man suffers from disease and is mortal, he will have need of medicine. This is not a need that can be analysed in cool objective terms. For the same blind forces of the Universe that have produced a being capable of sublime emotion and a grand imagination remain to visit him with suffering, to suddenly deprive him of his loved ones and to taunt him with the ever present threat of oblivion. Over the millennia, man has contrived to mask the terror of these threats. He has sought to neutralize them by magical rites and explanations. He has shored himself up with faith in Gods or universal spirits and tried to face them with a dignified resignation. But the Gods of vesterday are strangers in today's mental universe-outshone by the new products of man's hand and brain. Scientific medical technology has scored some impressive victories and has become our only credible weapon. But the threats remain. To men unconsoled by religion, these threats have a new starkness as they continue their random forays through the technological defences in which all hope now resides. If such is the real world of experience, then it is clear that industrial man needs a medical mythology to take over where a more rigorous science might leave off. It is not surprising that he prefers not to be questioned too searchingly on the overall effectiveness of the major active means of coping which he has-means which gain much of their credibility from their consonance with the general pattern of interaction between industrial man and external nature.*

The future of medicine

So far it has been suggested that the character of medical culture is largely determined by that of the wider culture of which it is a part and that the medical beliefs and behaviour of individuals are largely socially determined. It would be wrong however to ignore the scope for voluntary activity. For one thing, often as a result of the unintended consequences of past activity, social conflicts and tensions develop. In such circumstances the assumptions underlying past behaviour are more critically examined. The real world becomes more visible through the haze of past mythologies and ideologies and the opportunity is created for expanding the scope of human freedom. Within the wider sphere of productive life, as indeed within medicine, the most serious evolving crisis lies in industrial

* The parallel between the current idea of medical progress and the idea of progress within the wider sphere of productive life is worth noting. In each case, progress is seen to be the simple sum of what are taken as its component parts. Thus, if the hospital treatment of heart attack really did show a significant, if marginal, improvement over treatment at home, this would be regarded as progress. An increase from, say, 50 per cent in patients surviving five 50 to 70 vears following treatment for cancer would be regarded as further evidence of medical progress. So also in economic life: a+b cars per thousand population is better than a cars; x + y television sets better than x, and so on. But in terms of real human welfare, neither whole is the simple sum of parts such as these. There is as little reason for believing that the health of the population is being significantly improved as there is for believing that the material conditions for human life are becoming more favourable (see for example).64

^{*} Black magic may even cause its victim to waste away and die—as in "pointing the bone" amongst Australian aborigines.

man's relation to external nature.

It is clear that the increase in human numbers and the increase in material consumption per capita must reach limits in a finite world. Some analyses of available evidence suggest that these limits will become operative within decades rather than centuries. To an extent which will rapidly decrease through time, man has the opportunity to choose deliberately to limit population and economic growth in the hope of achieving a global population-capital system which is ecologically sustainable in the long term. Studies at the Massachusetts Institute of Technology using computer-simulated dynamic systems models suggest that stabilisation-that is the global equalizing of births and deaths and investment and depreciation -would need to be achieved well before the year 2000 if "overshoot and collapse" is to be avoided* 65. As policies designed to either halt the decline, or actually to increase, the death rate-for example, the suspension of effective health care for infants -are hardly acceptable, most hope rests on the reduction of the global birth rate. The enormous momentum of demographic increase leaves little room for optimism.

"If the world population as a whole reached a replacement-size family by the year 2000 (at which time the population would be 5.8 billion), the delays caused by the age structure would result in a final levelling-off of population at 8.2 billion (assuming that the death rate would not rise before then—an unlikely assumption, according to our model results)".⁶⁶

The most reasonable guess is that there are likely to be collapses in human numbers and industrial production in different parts of the world, perhaps starting before the end of this century.[†]

It was argued in the earlier sections of this paper that the ecology of man should not be regarded as peripheral to medicine but indeed as central. It

† One naturally hopes that these predictions of "ecodoom" will prove to have been unduly pessimistic. But in view of the stakes involved and of the possibility that concerted effort may yet serve to avert the worst disasters, it is more prudent to gamble on them being right than on them being wrong. Unlike much of the current technology of industrialised societies (including high medical technology), intermediate technologies may serve to reduce rather than increase international tensions.

was well recognised in Hippocrates' time that health depends on man's relation to his environment—as is shown in the quote at the beginning of the paper.

The momentou's task facing those involved in medicine who are committed to the reduction of human suffering and who are in the process of freeing themselves from the ideology of the industrial era is to seek resolutions of the evolving conflicts in the medicine of industrial societies that do not exacerbate mankind's ecological predicament and that do not preserve the current inequalities between the rich and the poor of the world.

For many the scope for choice seems limited. The human authorship of existing medical science and technology is not appreciated—their social relations are opaque. Medical technology appears as an autonomous alien force, not subject to human control but to whose progress man must "adjust" if he is to avoid (in the most alienated* phrase of them all) "cultural lag".

The first step, and the one which I have attempted in this paper, is to develop a critical theory of industrial medical culture, to analyse the emerging contradictions on both the material and cultural planes and, in so doing, to suggest the possibility of choice where to many it does not appear to exist. I have argued that the currently dominant engineering approach to the improvement of health is not only too expensive (even for America) but is largely ineffective. It is also self-defeating. Its dynamic expansionist character makes its dependent on further economic growth. Such growth is likely

further to disrupt the relationship between man and his environment and it is on this that health ultimately depends.

There is also the global aspect. Just as the ability to travel over the surface of the earth in a motor car is now an aspiration for much of mankind, so, too, is the hope of coping with disease by high technology hospital medicine. The fulfilment of this latter aspiration, as of the former, would only be possible the basis of global economic on development on a scale that is likely to be self-limiting-either through the exhaustion of non-renewable resources or through overloading the biosphere with pollution. The frustration of aspirations such as these will greatly increase the future risk of war between the rich and the aspiring poor. In an attempt both to avert ecological disaster and at the same time to reverse the growing economic inequalities in the world, the concept of intermediate technologies has been developed. The essence of such technologies is that they have a low ecological demand and, because of this, are potentially available to all men for all time. Unlike much of the current technology of industrialized societies (including high medical technology), intermediate technologies may serve to reduce rather than increase international tensions. A medical technology that concentrates on creating a relationship between man and his environment that is favourable to health shares these virtues of intermediate technologies.

Because the existing body of medical theory is so heavily oriented towards the engineering approach, the theoretical task involved in working out an ecological approach within medicine is considerable. It will be necessary to complement the existing "biology of the organised individual" with the "biology of populations". Whilst one can hardly expect those professionally committed to the current strategy to give a lead in this project, there are a number of older doctors who remain sceptical of the real benefits of recent scientific advances,17 67 and the increasing disillusionment of some young doctors with high technology medicine is encouraging.*69

^{*} The calculations allow for anticipated technological advances including the reduction of nonrenewable resource consumption per unit of industrial output and pollution generation per unit of industrial and agricultural output to one fourth of their 1970 values.

^{*} Alienation as a critical concept refers to this non-voluntary subjugation to what is in fact a human product as though it were some alien force—as though it were part of the "objective order of things". The concept has been neatly inverted by some to mean a sense of conscious estrangement, for example of young people from old. A nice example of technological alienation in the critical sense, is contained in the title of a recent volume in the Harvard Studies in Technology and Society—Human Aspects of Biomedical Engineering: As though there could be any other aspects. (I should add that the heading of the fifth section of my paper is intentionally ironic).

^{*} Whereas four years ago 4 per cent of students entering Harvard Medical School indicated that public health was their career objective, this year (1970) thirty-nine per cent of entering students state that public health is their first or second choice for a career".⁶⁸

A switch in emphasis away from the engineering approach to the improvement of health towards an ecological one could not be rationally opposed on the grounds that the health of the community would suffer. On the contrary, it should lead to significant progress in reducing the incidence of the diseases of maladaptation. These constitute a large part of the contemporary burden of ill health and the engineering approach has so far made very little progress against them. It is clear however that a relative change in strategies would create severe strains on the "helping to cope" side of medicine. A moratorium on the further deployment of expensive hospital-based therapies, for example, would be seen by many to cut off their greatest source of hope. To deliberately slow down the momentum of high technology medicine is to question its promise. Without the promise of better things to come, industrial man will find it that much harder to suppress an awareness of his vulnerability to forces he cannot control. Also, within an ecological approach moral responsibility for the health consequences of individual and collective behaviour would be stressed. How much easier it is to say, even if only half seriously: "Don't worry doctor, by the time I get lung cancer they will have a cure for it." Those who have illusions about the potential of high technology medicine are bound to be disillusioned. But such disillusionment is, in any case, growing. It is a decreasing minority who can entirely suppress the feeling that it is the industrial way of life itself that is to blame for much ill health and that drugs and surgery are only partial answers to this problem.

How then might medicine help people to cope with their vulnerability to suffering and premature death if hope could no longer be pinned on high medical technology? Firstly, the problems to be coped with at an individual level would not be new. Any one individual, for example, would be likely to experience fewer deaths than would have been the case say two centuries ago. At that time parents could reckon on losing at least half their children and epidemics were a constant threat. What would be new under these circumstances, would be the limited availability or credibility of previously prominent modes of mediation between man and disease. The current complex

combination of effective technology rationally deployed and technology serving as magic, which I have argued forms the core of industrial medical culture, would have a greatly diminished role. On the "effectively combating disease" side, effort would be switched to man's relation to his environment. On the "helping to cope" side, such responses as intensive cardiac care and liberally distributed antibiotics, for example, may come to be regarded as much too expensive magic. They might also be seen as contrary to the spirit of the ecological approachfor if one can rely on the repair service why bother to take perhaps onerous steps to prevent disease? "High technology as magic" would have limited availability and, hopefully, limited credibility. The possible development of other interpretations of the problem of disease and of other forms of ritual response to threats and misfortunes should not be excluded. Perhaps the growing ecological movement is already generating its own medical "counter culture". There is a new readiness to make a diagnosis of "bad life-style" and a new yearning for harmony with nature-well expressed in the title of the "Friends of the Earth" organisation. There is a growing apprehension about chemical pollutants finding their way into the human body and this is likely to bring with it a more cautious approach to the consumption of drugs. Health foods, herbal remedies and meditation are responses that are gaining in popularity. At least they are likely to do less harm than their engineering counterparts and at best they serve to reinforce a more effective strategy for the improvement of health, and one which is not tied to an economic base that is not sustainable in the long term and which can never be made available to the mass of humanity.

Another traditional mode of mediation between man and disease that has already largely lost its credibility is theistic religion. But there are other religious traditions which may well retain their validity. Mysticism, for example, may be regarded more as a statement about the human spirit than about the universe. Why should mystical feelings of unity with the natural order be regarded as less valid than the current perception of nature as the stuff of domination? The hard-headed may care to recall the Stoics. At a time when disease and death must have been a good deal more immediate in their presence than they seem today, the Stoics faced the inevitable with a dignified resignation. It will always be a central function of medicine to support such resignation.

Within an "alternative medicine", compassion could once again have a central place. In a more stable society relatives could play a larger part in the care of the elderly and disabled. In a society that placed less emphasis on performance in a demanding productive apparatus, the insane and handicapped would not just be tolerated, but would find it easier to exist in the mainstream of society.

These are some of the ways in which the "helping to cope" side of medicine might find expression following a relative switch in strategies to an ecological approach to the improvement of health. It remains to be seen whether industrial culture will in fact change course and whether such an "alternative medicine" will be both developed theoretically and come to be expressed in social practice.

If prospects in the real world seem terrible there may be little willingness to forsake the promise that the further development of high technology medicine is alleged to offer. If industrial man does continue much farther on his current course it may be that a good deal more than his health will be placed at risk.

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Reports

A law for organic farmers

On 11 May 1972, a Bill was introduced into the US Congress to amend the Federal Food, Drug and Cosmetic Act so as to regulate the advertising and distribution of organically grown and processed food.

The amendment was largely the result of campaigning by Rodale Press, a publishing house which specialises in books and magazines on organic farming, waste recycling, nutrition and the environment. Rodales were becoming increasingly aware of the need to protect consumers and to provide guidelines for producers in what is probably the most rapidly expanding area in the food industry. In the absence of any satisfactory definition of what constitutes organic farming, or organically grown food, farmers were confused and, inevitably, a minority were attempting to exploit the demand, mainly from the young members of America's large environmental movement, for food that has been grown with the minimum consumption of non-renewable resources and the minimum adverse effect on the environment. One wholesaler said at a Rodale Conference in San Francisco in May that he compiled a list of 200 suppliers, accepting their word for it that their produce was grown organically. When he came to investigate them his list was reduced to 20. Retailers of organically grown food in Britain can tell similar stories.

The Bill defines organically grown food as "food which has not been subjected to pesticides or artificial fertilisers and which has been grown in soil whose humus content is increased by the addition of organic matter". Organically processed food "means organically grown food which in its processing has not been treated with preservatives, hormones, antibiotics, or synthetic additives of any kind".

The Bill would hand over the regulation of the organic food trade to the Secretary for Health, Education and Welfare. Organic farmers and growers would have to register with the federal authority each year and then would be bound to adhere to the regulations. "No person may advertise or distribute in commerce a food or food supplement as 'organic', 'organically grown', or 'organically processed', unless such food is (1) grown, processed, or both grown and processed, as the case may be, by a person registered under this section and in accordance with the conditions prescribed by the Secretary, and (2) labelled in accordance with regulations prescribed by the Secretary."

The Bill has been referred to the Committee on Interstate and Foreign Commerce and it will be a measure of the popular demand for organically grown food and the desire for consumer protection if it is not killed by the agrochemical lobby. Interestingly, support comes from the Department of Health, Education and Welfare, rather than the Department of Agriculture.

In Britain, the Soil Association is attempting to draw up a workable definition of organically grown food, starting with vegetables and cereals and extending later to animal products. The standards are based largely on those agreed in 1968 between the Association and the Henry Doubleday Research Association and published in The Wholefood Finder. It is hoped that they will be used in connection with a trade mark. Under British law this may be all the consumer protection that is required, for once the produce is defined the Trade Descriptions Act will apply to it.

Michael Allaby

Student action

During the past academic year, students up and down the country have begun to set up environment-action groups at their colleges and universities. Whereas fifteen months ago there were only 28 groups in existence, now the count is just over 100.

Many start out by trying to raise the level of awareness of their contemporaries, organizing teach-ins, film shows, exhibitions and writing articles for their college magazines. Some ventured beyond the campus walls and aimed their eco-evangelism at the local community. For example, members of the Leeds University Society for Social Responsibility in Science broadcast on local radio eight programmes that they had prepared themselves, on such topics as traffic, noise and air pollution.

More importantly perhaps, most groups identify specific problems and devote most of their energies to carrying out campaigns and action on these. A number have decided to try and persuade the college to recycle its waste paper. This may sound a relatively simple operation that could be quickly completed. In fact it involves finding out how much paper is used and of what quality, whether a local paper merchant would accept it, what the attitudes of the cleaners and the authorities would be, what could be arranged for the vacation, and so on. It's not surprising then that success has so far been limited to the groups running the schemes themselves. However, a group at Hendon College of Technology was successful in persuading the refectory committee to abandon the use of one-trip aluminium plates. They prepared an environmental and economic cost analysis (they discovered that about £25 worth of aluminium was being thrown away every week!) and submitted it to the committee who eventually agreed to revert to using good old china plates.

Another popular object for a variety of campaigns was the car, and plans designed to accommodate it. The Environmental Action Group at Manchester University managed to oppose plans to build an expensive multi-storey car park on the campus. The Leicester Ecology Action Group (based on Leicester Polytechnic) took on a more formidable task, namely to publicize the iniquities of the traffic and road plans currently being considered by the city council and to advocate alternatives. They have recently produced an impressive and well-documented report on Leicester's transport problem. The next step in the campaign must await news of the council's decision. It might take the form of a bike-in, a type of protest which seems to have widespread appeal (at least seven have taken place in the last year). Bradford University Conservation Society concentrated their efforts on a 'dirty lorry' campaign, celebrating Dirty Diesel Day last April by collecting some 200 registration numbers of offending vehicles. The City Transport Department were not at all amused when they were told that seventy-five of the offenders were Bradford City Transport buses, and a further nine were City Cleansing Department vehicles!

A group at Aberdeen University, The Society for the Protection of the Environment, decided that before adopting any campaigns they should carry out surveys to find out what Aberdeen's

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environmental problems really were. Accordingly they have undertaken surveys of the local river, of the town's derelict land, of the incidence of bronchial complaints which might be linked with air pollution and on consumer attitudes to non-returnable packaging. As well as all this, they have cleaned up a local beauty spot and also obtained permission from the Director of Education to visit 40 primary schools in the town to talk about pollution.

Carrying out management on nature reserves and other areas of scientific or recreational value is the work of conservation corps of which at least nine are based on colleges or universities. The University of East Anglia boasts a large and hyper-active corps involving over 250 members. Two 'tasks' are organized every term time weekend and already (the group is barely a year old) many hundreds of man-hours have been worked, clearing scrub, making paths, planting wind breaks and so on. Already they are running out of suitable rural tasks to undertake and they hope to begin on some urban ones next year, perhaps combining forces with student community action groups.

Two groups have been designing "trails", one in the country and one in a town. Alsager College of Education (one of the few Colleges of Education to have formed a group) have prepared a nature trail at Alderley Edge for The Cheshire Trust for Conservation. The group at Cheltenham College of Art has almost completed an "urban trail" through the town. A guide will be published which will point out examples of bad planning, vandalism, dereliction and pollution along the trail. The project has been backed by the local Education Department, and is being introduced directly to children and school teachers through contracts with individual schools and with the town's Teachers' Centre.

These then are some of the activities that student eco-groups are currently tackling. To the members of many of them it has become increasingly clear that what they are attempting in their spare time is often a more valid and worthwhile educational experience than what they are supposed to be doing in their courses. Students rapidly lose their enthusiasm for sitting passively in lectures or libraries or laboriously working through the same old laboratory experiments, soaking up the appropriate conventional wisdom(s). Already one or two environment groups are beginning to realise that perhaps they should be actively campaigning for changes in the structure and content of higher education in this country, not an easy campaign, and one fraught with problems and pitfalls, but in the long term one which could have the most impact.

Meanwhile, any student interested in forming an environment group at his or her college is urged to write to The Conservation Project of the National Union of Students at 3, Endsleigh Street. London, WC1 (telephone 01-387 1277). The Project, set up a year ago, works to encourage the formation of such groups providing help and information. It organizes workshop conferences at which activists from all over the country can meet and exchange ideas and experiences. During term time, it publishes a monthly newsletter, CONSERNUS, which is sent free to all groups and interested individuals. We look forward to hearing from you!

Nick Brown

Classified Adverts

CHARTERED ACCOUNTANT, 30, commercial and consultancy experience, seeks non-run-of-the-mill position, connected with environmental conservation. Reply to Box No. 167.

YOUNG ENGLISHMAN, emigrating to Canada in October-November would like to join a Company working in the Environmental or closely allied fields. Qualified Designer, with considerable Industrial experience in the building and housing industry in design and design management and proven ability to sell. New job would be in either the design or marketing sectors. Initial salary not of great importance but opportunities for promotion must be real. Excellent references, basic French, 29, single. Box No. 166.

WHOLE EARTH ENTERPRISES is a young, dynamic, active organization set up to stimulate community and individual action and to promote the organic concept (recycling, farming, gardening and nutrition) in Britain.

We would like to hear from active people who would like to help us carry our plans through. For further details write to: 44 Earls Court Road, London W8.

WHOLE EARTH ENTERPRISES is looking for a business associate to sell ad. space, promote and distribute specialised environmental magazines and booklets. Address above.

IMPORTANT! We're compiling a list of all types of environmental action groups, school and university eco-societies, conservation associations etc. so that information can be exchanged and so that the energies of people who want to be environmentally active can be channelled effectively. Please send name and functions of your group together with examples of your projects to date. Whole Earth initiated.

HOUSEWIVES CARRY a great responsibility in maintaining health and vitality of their families. Recognizing this, Whole Earth is starting up an Organic Cookery Society.

Various aspects relating to food, kitchencraft and cooking will be covered: good food purchasing, cooking methods to preserve nutritional value, food preparation and plenty of recipes will be exchanged. Whole Earth initiated.

THE ECO-ACTIVISTS are starting up recycling centres all over Britain. If you've got any muscle power going spare, please join us. Whole Earth initiated.

AN ACTION GROUP to fight packaging, processed foods and phosphate detergents and other unsound consumer items and practices is being set up. Enquiries welcome. Whole Earth initiated.

A NON-CHEMICAL pest management control research programme has recently been set up. We are now looking for an associate to help with the rearing of and experimentation with biological pest control organisms for ultimate use in orchards and field crops. Whole Earth initiated.

Among books on the population problem this one is unusual - it is not a prophecy of certain doom. Professor Fremlin, well known for his talks and discussions (both live and on TV) on the effects of science on society, describes what life will have to be like in the next century and suggests new and humane ways of curbing population growth.

'A lucid account of the threatening problem of unlimited population increase . . . should be widely read.' Sir Julian Huxley

£2.95 Hart-Davis, MacGibbon Granada Publishing

Friends of the Earth Newsletter

Militancy

If ever there was a word the meaning of which has been warped by the heat of heady journalese, it is that old friend "militant". A dozen times a day Friends of the Earth and other groups like it are accused of being militant, and a dozen times a day are accused of not being militant enough. The former complaint more often than not comes from those of our number who equate militancy, particularly that brand of the product which questions the direction in which an increasingly urbanised industrial society is taking us, with a threat to the perfectly reasonable acquisition of money. Militancy rocks the boat, is unpleasant and not infrequently embarrassing. Worse still, militancy is sometimes successful. Of course everyone wanted David to win, but some are a little perturbed that a fellow as powerful as Goliath should be beaten by a boy throwing stones.

When people complain that groups lack militancy, what they are really saying is that more fuss should be made by them: the boat, the Ministers' cars should be rocked more frequently and with a bit more gusto. But whilst such action is today undoubtedly described as militant, it really is no such thing. No local or national environmental group in Britain couuld possibly be described as militant. None is involved in warfare and none has resorted to physical combat with its opponents, some of which paradoxically are themselves involved in warfare in other parts of the world, supply armies and governments with military hardware and in the strict and (if possible) nonpejorative sense are truly militant.

But whilst it is the case that the Japanese experience of people physic-

ally fighting the construction of an airport or a motorway has not been repeated in Britain, that is not to say that it will not occur here. Indeed, such is the enormous concern shared by all manner of people about many aspects of land-use policy, that it is almost inconceivable that clashes, especially over the future of national parks, will be avoided. And that it will be land over which conflicts arise should not be surprising for it is appreciation for land that our island culture has somehow instilled in all of us.

Today, the biggest single threat to the national park areas which were "set aside for the benefit of the nation" comes from the greed of mining companies and the decision of the Government financially and legislatively to aid them in their exploration and exploitation programmes. But this is only the latest threat. Since the Parks' inception, successive Governments and Planning Departments have permitted and even sponsored their erosion. And to add insult to injury, there have even developed avoidable disagreements between the designers of National Parks and the farmers who derive their livelihood from them. Any farmer is justified in resenting restrictions placed on him when no restrictions seem to apply to mining companies: any farmer is entitled to complain if properly negotiated access agreements and awards of compensation are not forthcoming.

So when the bulldozers move into the parks and Mr. Crosland makes another speech about it being necessary for the benefit of his Grimsby constituents (who of course like many millions of others also enjoy the freedom of the North York Moors, Yorkshire Dales and the Peak District), what will happen? Thousands of mostly young people from all over the country: climbers, walkers, hostellers, students, teachers, kids from the East End who went to Snowdonia with the school, will somehow get to the site and as peacefully as the situation permits, will stop the digging and will stay in the park until someone in Westminster cottons on to what the arguments are all about.

Fantasy? Not really. In most of the "developed" countries of the world (as in Britain) young people have shown tremendous patience in tolerating incessant erosion of what was to have been their inheritance. Occasionally and with good reason, their patience has snapped. In Sweden, it was the threat to the Stockholm elm trees, in Germany a nature reserve. In Britain it will be the proposed destruction of the national parks. When it comes to the crunch, youngsters will prove Mr. Peter Walker right when he said that it is they who are his "greatest allies" in the defence of the environment.

And even when patience runs out we won't really be—what's the word? militant. After all is said and done, putting sugar in a bulldozer's petrol tank is relatively undramatic compared with blowing up a mountain, and it hardly constitutes warfare.

Graham Searle

INFORMATION FOR SURVIVAL DIGEST

The first issue of the Information for Survival Digest is now available. Information for Survival is the data storage and retrieval service that covers every aspect of man's relationship with his environment. It is based on abstracts obtained by volunteers and fed into a data bank. The Digest, which abstracters receive free of charge, consists of selected abstracts.

Copies are obtainable now from Dr. K. E. Barlow, The Old Forge, Great Finborough, Stowmarket, Suffolk, price 13p post paid.

Wind power

Sir,

I was interested in Lawrence Hill's article about wind power. (*The Ecologist*, May 1972.)

I am interested in the development of a small island in Lake Victoria where there is a strong convection wind which blows from 11 a.m. until about 6.30 p.m. every single day of the year, with a gentler breeze at night in the reverse direction. Thus this area, and many other places around the lake, has a perfect, one hundred per cent reliable power source.

We hope to use this wind soon to pump water for an irrigation project which will greatly increase the productivity of the people on the island. It might also be useful to generate small amounts of electricity for use in the school and the new hospital for lighting. However, new wind generators are expensive, and unfortunately do not compete with diesel generators (at this time while the price of diesel fuel is still low). Even diesel pumps seem to be cheaper than wind pumps, at least over a short period.

I would be interested to hear from any readers who may know of any second hand but usable wind generators or wind pumps (able to pump from the water level up to about 40 feet). We could probably arrange to pay for shipping.

Incidentally, the Brace Research Institute, McGill University, Canada, has some interesting material on windmill design: "The Design Development and Testing of a Low-Cost 10 hp Windmill Prime Mover, Brace Research Institute Publ. No. MT 7. July 1969. This paper deals with some of those aerodynamic design problems mentioned by Mr Hills.

Yours faithfully,

E. G. Matthews,

Musingu High School, P.O. Box 151, Kakamega, Kenya

Decline of Bath Sir.

Gerald Foley's article on Bath makes sad reading to those of us, brought up on English literature, for whom Bath has a special niche—the town that once harboured Jane Austen and Tobias Smollett, both of whom wrote great novels with Bath as a setting, and where the *bon ton* of the 18th century hobnobbed: Horace Walpole, Alexander Pope, Lord Chesterfield, Dr Johnson, Congreve, Addison, etc. What a host of memories this brings to all lovers of 18th century literature and life. The civilised century.

On my last visit to Bath, in 1969, the city was taking a cruel beating from the automobile. Traffic jams were incessant, smog made breathing difficult, and the lovely Bath stone houses were sooty and decaying in the inner part of the city. At night hoodlums roamed the streets... It was hard to believe that the town fathers would permit their gem-like city to become a replica of an American town (without the beautiful buildings).

Now Professor Buchanan with the consent of the town council is determined to destroy the amenities of Bath with a tunnel and an invitation to yet more traffic, just exactly in the American fashion. All one can say is the idea is barbaric.

Instead, if an American lover of Bath may offer a suggestion, automobile traffic should be drastically curtailed in the old city. People should be encouraged to walk through the flower-bedecked streets and enjoy the full beauty of the Abbey and the Baths and shops. For those who are physically unable to walk minibuses should be provided, in addition to the one that now takes people to the Assembly Rooms.

Yours sincerely,

Anthony Netboy, Jacksonville, Oregon 97530.

World income distribution and ecology

Sir,

The economic activity of most rich countries depends heavily on imports of raw materials from poorer countries. This dependency is particularly strong for petroleum and minerals, for which synthetic substitutes are not readily available.

Prices of raw materials have been kept relatively low by factors such as the political diversity of the poor countries and the ownership of processing industries by companies based in rich countries. It is clearly in the interests of the producing countries to overcome these factors, particularly by forming trading unions to raise prices. OPEC has successfully demonstrated this principle for petroleum production.

If the prices of several important commodities were to rise considerably, due to the formation of such unions, the actions of the importing countries would follow in the sequence:

- 1. The use of "influence" to subvert the supplier unions. The success of this move depends on the solidarity of the suppliers. If unsuccessful, then follows:
- 2. Attempts to increase productivity of production of exports from the rich countries so as to maintain the same import flow. The average effect of this over all rich countries will be zero.
- Reduction of imports by the rich countries, to be reflected initially in price rises of goods for home consumption. There would follow a gradual rise in the efficiency of usage of materials and the degree of recycling. Both total and nonrecoverable throughputs would show a declining trend.

This decline of throughput is entirely consistent with movement towards an ecologically sound economy. Additionally, political pressures to achieve full employment would lead to increasing labour-intensiveness, also generally considered to be ecologically desirable.

Movement of wealth towards the poor countries should improve their health and education services and lower the level at which their populations eventually stabilise.

Although this analysis neglects many subtle factors and the process outlined has little effect on long-term stability, it seems clear that the development of trading unions should be welcomed by the ecologically aware. Governments show no indication of reducing economic growth without such pressure.

Yours sincerely,

Gordon Thompson,

The Red House, Hinksey Hill, Oxford

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